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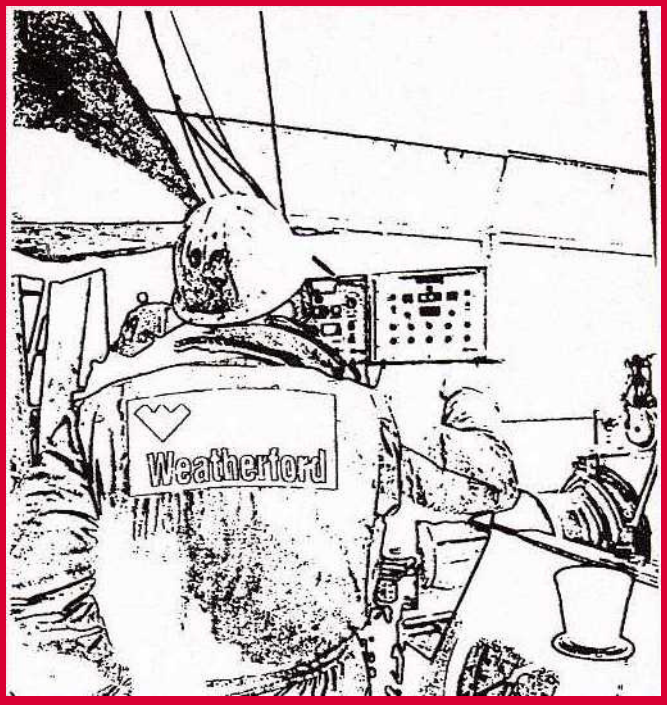

TECHNICAL DATA HANDBOOK

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Drilling & Intervention Services

Corporate Headquarters
Houston, Texas

Tel: 713-693-4000
Fax: 713-693-4295

The intent of the WEATHERFORD Technical Data Handbook is to supply oil and gas well drilling and well servicing personnel with the most comprehensive single source of information possible for routine drilling, production, completion and workover operations.

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Drilling & Intervention Services

Canadian Head Office 780-955-8070
Nisku, Alberta Fax: 780-955-6368
Calgary Sales Office 403-269-7788
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Tel: 780-448-1721

Fax: 780-448-1741

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HANDBOOK CONTENTS

	Section
Bumper Subs & Jars	1
Casing	2
Casing Patches	3
Casing Scrapers	4
Cutters - Swivels - Underreamers -- Section Mills & Whipstocks	5
Drill Collars - Kellys - Elevators - Spiders & Links	6
Drill Pipe - Heavyweight	7
Electrical Wire Line	8
Junk Catchers	9
Overshots	10
Packer Retrievers - Casing Rollers & Reversing Tools	11
Rock Bits & Floats	12
Safety Joints - Knuckle Joints	13
Spears - Spear Pack Offs	14
Special Service Problems	15
Stretch Data	16
Sucker Rods	17
Tool Joints	18
Tubing	19
Wash Over Pipe	20
General Information	21

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SECTION 1
FISHING, DRILLING AND BUMPER JARS

	Page
Weatherford Homco™ Bumper Jar	1-2
Bowen Surface Jar	3
Bowen Hydraulic Rod Jar	4
Bowen Type “Z” Oil Jar	5 - 9
Bowen Super Fishing Jar	10 - 13
Bowen Jar Intensifiers	14- 16
Bowen Cushion Sub	17- 18
Bowen Hydro-Mechanical Drilling Jar	19- 21
Bowen Lubricated Fishing Bumper Sub	22 - 23
Bowen Fishing Bumper Sub	24 - 26
Lee Oilfield Compounders	26
Lee Oilfield SJ Type Fishing Jars	27 - 28
Lee Oilfield Surface Jar	29
National Oilwell (Griffith) Fishing Jars	30
National Oilwell (Griffith) Extreme Service Fishing Jar	31

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Page

National Oilwell (Griffith) Fishing Jar Intensifier 32

National Oilwell (Griffith) Bumper Sub 33

National Oilwell (Griffith) Double Acting Hydraulic/Mechanical Drilling Jar 34

National Oilwell (Griffith) Drilling Jar Intensifiers 35

National Oilwell (Griffith) Hydraulic/Mechanical Drilling Jar 36

National Oilwell (Griffith) Double-Acting Drilling Jar Intensifiers 37

National Oilwell (Griffith) Temperature Compensated Shock Tools. 38

National Oilwell (Griffith) Balanced Bumper Subs 39

National Oilwell (Griffith) Mechanical Drilling Jars 40

National Oilwell (Griffith) Pressure Compensated Shock Tools 41

PBL By Pass System ..... 42 - 43

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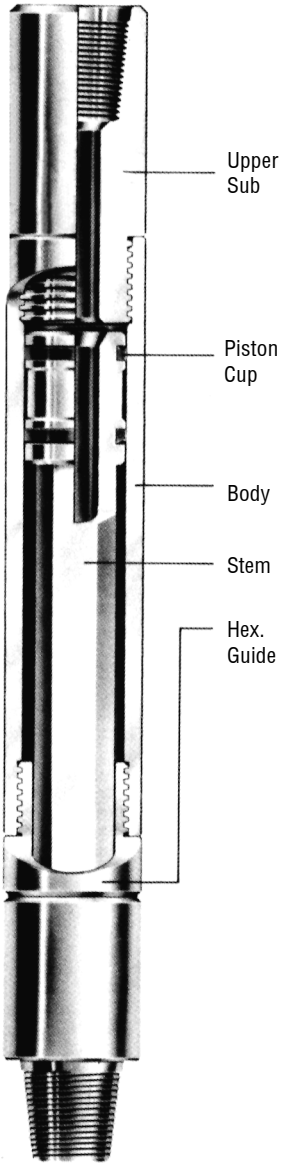
WEATHERFORD HOMCO™ HEXAGONAL BUMPER JAR

With a sharp blow up or down, the Weatherford HOMCO™ Hexagonal Bumper Jar will help remove stuck fish or release a spear or an overshot from a fish.

Manufactured from heat-treated alloy steel, the stem includes the piston, hex stem and lower sub in one piece. The hex guide sub drives the stem and is welded around the hex stem with sufficient clearance for free travel and fluid passage. The close tolerances on the chrome plated body provide a positive seal between the body and the piston. Two special pump cups on the piston end of the stem are molded to close tolerances to accomplish a perfect seal. They are specially designed to eliminate twisting and abrasion wear.

The bumper jar is installed in the fishing string directly above the connection tool being run. To produce a downward blow, lower the string at a rapid rate until the hex guide sub strikes the lower sub. For an upward blow, raise the string until the hex guide sub strikes the upper portion of the stem.

For maintenance, unscrew the hex guide sub from the lower end of the body, slide stem out, and clean all parts. The upper sub may also be removed to make cleaning easier. Replace the pump cups on the piston if necessary and lubricate when necessary.



Hexagonal Bumper Jar

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WEATHERFORD HOMCO™ BUMPER JARS

OD	ID	Conn.	Stroke	OD Mandrel	Tension Load Min. Yield Str.	Torsion Min. Yield
1 13/16"	0"	7/8" SR	18"	7/8"	35,700	350
1 13/16"	3/8"	1 13/16" H.S.L.	18"	1 1/4"	75,000	1,000
2 1/4"	1/2"	1 1/4" Reg.	18"	1/1/4"	87,500	1,450
3 1/8"	3/4"	2 3/8" Reg.	12-20"	1 3/4"	221,000	4,100
3 3/4"	1 3/4"	2 3/8" I.F.	20"	2 1/4"	315,700	7,900
3 7/8"	1 7/8"	2 3/8" EUE	20"			
3 7/8"	1 3/4"	2 7/8" Reg.	14-20"	2 1/4"	315,700	7,900
4 1/4"	2"	2 7/8" I.F.	20-24"			
4 1/2"	2 7/16"	2 7/8" EUE	24"			
4 3/4"	2"	3 1/2" F.H.	14-20"			
			24-36"	2 7/8"	370,000	12,000
4 3/4"	2"	3 1/2" I.F.	14-20"			
			24-36"	2 7/8"	370,000	12,000
6"	2 1/4"	4 1/2" I.F.	12-14-20"			
			24-30-60"	3 3/8"	588,800	22,700
6 1/4"	2 1/4"	4 1/2" F.H.	20-30-60"	3 3/8"		
6 1/2"	2 1/4"	4" I.F.	30-60"			
6 3/4"	2 3/4"	5 1/2" Reg.	30-48-60"	4 1/8"	721,000	41,500
7 3/4"	2 13/16"	6 5/8" reg.	30-60			
8"	2 13/16"	6 5/8" Reg.	30-60"	5 5/32"		
8 3/4"	3"	7" H-90	40-60"	5 1/8"	1,200,000	175,000

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BOWEN SURFACE BUMPER JAR
CALCULATED STRENGTH DATA

Maximum Torque at Yield in Ft. - Lbs.	52,400
Maximum Tensile Load at Yield in Lbs.	845,000
Maximum Allowable Pump Pressure in P.S.I.	8,000
Setting Load (Tripping Tonnage)	0 To 100 Tons

These figures do not constitute a guarantee, actual or implied; they are meant to serve as a guide only and appropriate allowance must be made in use, as a safety factor.

SPECIFICATIONS

Connection		5 1/2 Reg.
O.D.		7
I.D..		1 7/8
Stroke		48
Complete Assembly	Part. No.....	74520
	Weight	1160

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BOWEN HYDRAULIC ROD JAR
SPECIFICATIONS

Outside Diameter		1-1/2	1-3/4	2-1/8
Connections		15/16 10 Thd.	3/4 S.R.	7/8 S.R.
Stroke		9-3/16	10	11-5/16
Length Closed		38-15/16	42-3/8	64-1/8
Complete Assembly	Part No. Weight	28591 17	79316 22	13570 39

BOWEN HYDRAULIC ROD JAR
STRENGTH DATA

Jar Assembly Number	Calculated Jarring Load At Yield Point In Lbs.	Maximum Recommended Working Load In Lbs.*	Calculated Maximum Pull Load Jarring At Yield Point In Lbs.	Calculated Torque at Yield in Ft - Lbs.
28591 1-1/2" O.D.	15,000	9,900	55,200	255
79316 1-3/4" O.D.	23,500	15,500	62,400	421
13570 2-1/8" O.D.	33,900	22,400	110,000	1,075

* Based on 66% of calculated yield

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SPECIFICIATIONS
TYPE Z BOWEN OIL JARS

SIZE CONNECTIONS		7/8 SUCKER ROD	1 13/16 WILSON FJ	1 1/4 A.P.I. REG	2 3/8 PH6 5.9# HYD. BX.	2 3/8 EUE	2 3/8 A.P.I. REG.	2 7/8 A.P.I. REG.	2 3/8 A.P.I. I.F.	2 3/8 EUE	2 7/8 A.P.I. I.F.
OUTSIDE DIAMETER - Inches		1 5/8	1 13/16	2 1/4	2 29/32	3 1/16	3 1/8	3 3/4	3 3/4	3 3/4	4 1/4
INSIDE DIAMETER - Inches		1/4	5/16	3/8	1	1 1/2	1	1 1/4	1 1/2	1 7/8	1 15/16
TOTAL STROKE - Inches		7 1/16	7	6 15/16	11 7/16	11 9/16	11 13/16	11 13/16	12 1/8	10 1/8	11 13/16
TYPE JAR		SUB	SPECIAL SUB	INT. MAND.	SUB	SUB	INT. MAND.	INT. MAND	SUB	SUB	INT. MAND.
COMPLETE ASSEMBLY	PART NO.	70822	74723	54020	68010	55670	52504	52506	52528	52497	52502
	WEIGHT	41	60	50	108		125	168	119	158	220

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SPECIFICATIONS
TYPE Z BOWEN OIL JARS (CONT.)

SIZE CONNECTIONS	**2-7/8 E.U.E.**	**3-1/2 A.P.I. F.H.**	**3-1/2 A.P.I F.H.**	**4-1/2 A.P.I. F.H.**	**4-1/2 A.P.I. I.F.**	**5-1/2 A.P.I. REG.**	**6-5/8 A.P.I. REG.**	**7-5/8 A.P.I. REG.**
OUTSIDE DIAMETER -- Inches	4-1/2	4-3/4	4-3/4	6	6-1/4	6-3/4	7-3/4	9
INSIDE DIAMETER -- Inches	2-3/8	1-1/2	2	2	2-1/4	2-3/8	3-1/16	3-3/4
TOTAL STROKE -- Inches	12 1/4	11 13/16	13 5/16	11 7/16	14 3/8	14 11/16	14 3/8	13 13/16
TYPE JAR	INT. MAND.	INT. MAND.	INT. MAND.	INT. MAND.	INT. MAND	INT. MAND.	INT. MAND.	INT. MAND.
COMPLETE ASSEMBLY PART NO. . WEIGHT ...	52653 202	52530 325	52500 285	52498 590	52544 640	52680 757	52711 800	66346 1700

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BOWEN
RECOMMENDED WEIGHT OF DRILL COLLARS ABOVE JAR*

The following weights are provided as a guideline to the number of drill collars to be used and do not necessarily constitute the optimum weight for each hole condition which may be encountered.

JAR ASSEMBLY NO.	CONNECTION	O.D.	I.D.	WEIGHT RANGE (Lbs.)
70822	7/8" Sucker Rod	1 5/8	1/4	1,100 - 1,450
74723	1 13/16" WFJ	1 13/16	5/16	1,360 - 1,800
54020	1 1/4" Reg.	2 1/4	3/8	1,560 - 2,100
68010	2 3/8" PH6 5.9#	2 29/32	1	2,200 - 3,000
55670	2 3/8" EUE	3 1/16	1 1/2	2,300 - 3,100
52504	2 3/8" Reg.	3 1/8	1	2,400 - 3,300
52528	2 3/8" I.F.	3 3/4	1 1/2	3,400 - 4,600
52497	2 3/8" EUE	3 3/4	1 7/8	3,500 - 4,700
52506	2 7/8" Reg.	3.75	1.25	4,200 - 5,700
52502	2 7/8" I.F.	4 1/4	1 15/16	3,500 - 4,700
52653	2 7/8" EUE	4 1/2	2 3/8	3,600 - 4,900
52530	3 1/2" F.H.	4 3/4	1 1/2	6,300 - 8,500
52500	3 1/2" F.H.	4 3/4	2	5,600 - 7,500
52498	4 1/2" F.H.	6	2	10,200 - 13,800
52544	4 1/2" I.F.	6 1/4	2 1/4	11,800 - 16,000
52680	5 1/2" Reg.	6 3/4	2 3/8	13,000 - 17,500
52711	6 5/8" Reg.	7 3/4	3 1/16	11,000 - 15,000
66346	7 5/8" Reg.	9	3 3/4	14,300 - 19,600

* Optimum weights can be determined only by calculation and only if sufficient well data is available.

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RECOMMENDED TEST LOADS

FOR BOWEN TYPE Z HYDRAULIC JARS

Jar Size	Assembly No.	O.D.	I.D.	*Testing Pull Load Lbs.	**Maximum Allowable Load - Lbs. Jarring In Hole	Low Pull
1-13/16 WFJ	74723	1-13/16' '	5/16' '	6,000 - 10,000	18,000	4,000
1-1/4 Reg	54020	2-1/4' '	3/8' '	7,200 - 12,000	21,000	4,000
2-3/8 EUE	55670	3-1/16' '	1-1/2' '	12,000 - 16,000	27,800	6,000
2-3/8 Reg	52504	3-1/8' '	1' '	15,000 - 23,000	32,400	7,000
2-3/8 I.F.	52528	3-3/4' '	1-1/2' '	15,000 - 26,000	46,000	8,000
2-3/8 EUE	52497	3-3/4' '	1-7/8' '	15,000 - 26,000	46,500	8,000
2-7/8 Reg	52506	3-3/4' '	1-1/4' '	18,000 - 26,000	56,500	8,000
2-7/8 I.F.	52502	4-1/4' '	1-15/16' '	18,000 - 28,000	46,700	8,000
2-7/8 EUE	52653	4-1/2' '	2-3/8' '	18,000 - 28,000	49,000	8,000
3-1/2 F.H.	52530	4-3/4' '	1-1/2' '	28,000 - 45,000	85,000	10,000
3-1/2 F.H.	52500	4-3/4' '	2' '	28,000 - 45,000	74,500	10,000
4-1/2 F.H.	52498	6' '	2' '	41,000 - 62,000	136,400	10,000
4-1/2 I.F.	52544	6-1/4' '	2-1/4' '	55,000 - 80,000	159,000	12,000
5-1/2 Reg	52680	6-3/4' '	2-3/8' '	62,000 - 110,000	172,800	12,000
6-5/8 Reg	52711	7-3/4' '	3-1/16' '	63,000 - 100,000	149,000	12,000
7-5/8 Reg	66346	9' '	3-3/4' '	80,000 - 120,000	214,000	14,000

*These figures are based on a Tester speed of 2.50 ft. per minute. Pull speed to reach maximum allowable load, approximately 6-1/2 ft. per minute.
** See Calculated Strengths table for warnings and notes.

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TYPE Z BOWEN OIL JARS CALCULATED STRENGTHS

Jar Assembly No.	O.D. (In.)	I.D. (In.)	Recommended Maximum Jarring Load* (Lbs.)	Lift Load After Jarring At Yield (Lbs.)	Torque To Failure (ft.lb)
70822	1 5/8	1/4	15,400	46,300	420
74723	1 13/16	5/16	18,000	59,400	640
54020	2 1/4	3/8	21,000	118,500	2,200
68010	2 29/32	1	35,400	194,800	5,200
55670	3 1/16	1 1/2	27,800	160,200	5,900
52504	3 1/8	1	32,400	229,200	7,600
52506	3 3/4	1 1/4	56,500	345,000	13,500
52528	3 3/4	1 1/2	46,000	299,700	13,000
52497	3 3/4	1 7/8	46,500	179,500	8,200
52502	4 1/4	1 15/16	46,700	430,300	24,500
52653	4 1/2	2 3/8	49,000	375,000	25,900
52530	4 3/4	1 1/2	85,000	591,900	27,600
52500	4 3/4	2	74,500	468,800	27,100
52498	6	2	136,400	937,000	52,600
52544	6 1/4	2 1/4	159,000	917,400	56,900
52680	6 3/4	2 3/8	172,800	1,013,800	74,200
52711	7 3/4	3 1/16	149,000	1,587,900	145,300
66372	9	3 3/4	214,000	1,621,000	224,700

* Should be used only under ideal conditions ie: deep hole, moderate temperatures, etc.

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BOWEN SUPER FISHING JAR
SPECIFICATIONS

Size Connection		2-3/8 A.P.I. Reg.	2-7/8 A.P.I. Reg.	2-7/8 A.P.I. I.F.	3-1/2 A.P.I. I.F.	4-1/2 A.P.I. I.F.	4-1/2 A.P.I. F.H.	5-1/2 A.P.I. Reg.	6-5/8 A.P.I. Reg.
Outside Diameter (inches)		3-1/8	3-3/4	4-1/4	4-3/4	6-1/4	6	6-3/4	7-3/4
Inside Diameter (inches)		1	1-1/4	2	2	2-1/4	2	2-3/8	3-1/16
Complete Assembly	Part No.....	72888	145737	80468	79789	79691	145484	145440	72978
	Weight.....	160	300	320	465	890	998	1230	1464

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STRENGTH AND TEST DATA
FOR BOWEN SUPER FISHING JAR

Assembly Part Number	JAR SIZE			Maximum Recommended Jarring Load In Hole* (lb.)	Tensile @ Yield in Lbs. After Jarring	Torque At Yield (ft.lb.)	Jar Tester Pull Load	
	Connection	O.D. (inches)	I.D. (inches)				Low** (lb.) Min.- Max.	STANDARD (lb.)
72888	2-3/8 Reg.	3-1/8	1	59,000	257,000	7,000	9,000 - 12,000	30,000
145737	2-7/8 Reg.	3-3/4	1-1/4	78,000	324,000	11,000	12,000 - 16,000	39,000
146544	2-3/8 I.F.	3-3/4	1-1/2	66,000	333,000	12,000	11,000 - 15,000	33,000
147902	2-3/8 EUE	3-3/4	1-7/8	48,000	258,000	9,600	10,000 - 15,000	24,000
80468	2-7/8 I.F.	4-1/4	2	62,000	374,000	18,000	12,000 - 18,000	31,000
79789	3-1/2 F.H. 3-1/2 I.F.	4-3/4	2	98,000	575,000	28,000	14,000 - 20,000	49,000
145484	4-1/2 F.H.	6	2	196,000	913,000	46,000	14,000 - 20,000	98,000
79691	4-1/2 I.F.	6-1/4	2-1/4	200,000	1.1 million	66,000	16,000 - 25,000	100,000
145440	5-1/2 Reg.	6-3/4	2-3/8	250,000	1.2 million	78,000	16,000 - 25,000	110,000
72978	6-5/8 Reg.	7-3/4	3-1/16	265,000	1.7 million	130,000	16,000 - 25,000	110,000

WARNING! All jarring and pulling loads shown in the manual assume that the force is acting alone and is essentially along with major axis of the tool. If torque and tension or bending and tension are used together, the resulting combined stresses may lead to failure at substantially less than rated loads. Rotation and bending together can lead to fatigue.

* Loads shown are maximum recommended pull loads. Pulling above the value shown can damage the tools.

**If jar does not test at maximum low pull load shown - disassemble, inspect and repair tool.

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BOWEN SUPER FISHING JAR WEIGHT CHART

The following weights are provided as a guideline to the number of drill collars to be used and do not necessarily constitute the optimum weight for each hole condition which may be encountered.

Assembly Part No	Connection	O.D. (inches)	I.D. (inches)	Weight Range (lbs)
72888	2-3/8 Reg.	3-1/8	1	2,100 - 3,600
145737	2-7/8 Reg.	3-3/4	1-1/4	3,000 - 5,000
80468	2-7/8 I.F.	4-1/4	2	3,300 - 5,700
79789	3-1/2 I.F.	4-3/4	2	4,400 - 7,500
145484	4-1/2 F.H.	6	2	7,600 - 12,900
79691	4-1/2 I.F.	6-1/4	2-1/4	8,100 - 13,600
145440	5-1/2 Reg.	6-3/4	2-3/8	9,400 - 16,200
72978	6-5/8 Reg.	7-3/4	3-1/16	12,100 - 20,500

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SUPER FISHING JAR FLOATER POSITIONING

ASSEMBLY PART NUMBER	JAR SIZE			STEEL FLOATER NUMBER	FLOATER POSITION NORMAL SERVICE (in.)	FLOATER POSITION HIGH TEMP (in.)
	CONNECTION	O.D. (in.)	I.D. (in.)			
72888	2 3/8 Reg.	3 1/8	1	151580/005	7 3/8	9 1/16
145737	2 7/8 Reg	3 3/4	1 1/4	151584/005	8 9/16	10 3/16
146544	2 3/8 I.F.	3 3/4	1 1/2	151583/005	8	9 11/16
147902	2 3/8 EUE	3 3/4	1 7/8	151577/005	8 1/4	10 1/8
80468	2 7/8 I.F.	4 1/4	2	151576/005	8 11/16	10 1/2
79789	3 1/2 F.H. 3 1/2 I.F.	4 3/4	2	151578/005	10 9/16	12 13/16
145484	4 1/2 F.H.	6	2	151579/005	10 5/8	12 5/8
79691	4 1/2 I.F.	6 1/4	2 1/4	151582/005	10 11/16	12 1/2
145440	5 1/2 Reg.	6 3/4	2 3/8	151581/005	10 15/16	13
72978	6 5/8 Reg.	7 3/4	3 1/16	102516/005	12 1/4	12 1/4

NOTE: Measure distance from floater face to pressure body end.

Users of jars and bumper subs should be aware that milling or drilling operations may develop stresses in these tools that are more complex than the simple torsional and tensile values listed in Bowen strength data. If unstabilized, the weight necessary for milling can induce bending forces that combine with torsional forces to generate very high stresses in some areas of the tool. Rotating in a deviated hole condition or with the tool in a neutral point may have the same effect. The necessity for milling is recognized and this is not intended to advise against such operations, but merely to caution the user of possible dangers when rotating under the conditions described.

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BOWEN JAR INTENSIFIERS (FOR HYD. JARS)
SPECIFICATIONS

Connections	Per Order	1 13/16" Wilson F.J.	1 1/4" A.P.I. Reg.	2 3/8" PH6	2 3/8" A.P.I. Reg.	2 3/8" A.P.I. I.F.	2" EUE	2 7/8" A.P.I. Reg.	2 7/8" A.P.I. I.F.
Outside Diameter - Inches	1 5/8	1 13/16	2 1/4	2 29/32	3 1/8	3 3/4	3 3/4	3 3/4	4 1/4
Inside Diameter - Inches	1/4	5/16	3/8	1	1	1 1/2	1 7/8	1 1/4	1 15/16
Jars Used With:	70822	21150	54020	68010	52504	52528	52497	52506	52502
		74723	18775		42736	37406	20150	38040	44483
Total Stroke to Solid - Inches	6	6	6	12 3/4	8 3/4	7 7/8	7 5/8	8 1/4	8 5/8
Complete Assembly									
Part No.	70957	64460	50640	68262	55867	55747	50660	55895	55664
Weight	40	48	80		117	154	241	199	222

Connections	2 7/8" EUE	3 1/2" A.P.I. F.H. OR I.F.	3 1/2" A.P.I. F.H. OR I.F.	7 5/8" A.P.I. Reg.	4 1/2" A.P.I. F.H.	4 1/2" A.P.I. I.F.	5 1/2" A.P.I. Reg.	6 5/8" A.P.I. Reg.	6 5/8" A.P.I. Reg.
Outside Diameter - Inches	4 1/2	4 3/4	4 3/4	9	6	6 1/4	6 3/4	7 3/4	7 3/4
Inside Diameter - Inches	2 3/8	1 1/2	2	3 3/4	2	2 1/4	2 3/8	3 1/16	3 1/16
Jars Used With:	52653	52530	52500	66346	52498	52544	52680	52711	72978**
	35849	25960	38110	-	14710	12370	11130	15160	-
Total Stroke to Solid - Inches	10 3/8	8 7/8	10 1/8	13	8 5/8	13	13	13	12
Complete Assembly									
Part No.	50708	50700	55812	66372	55860	55905	50720	55910	78964**
Weight	356	446	460	1870	653	820	928	1248	1920

** Super Intensifier used with Super Fishing Jar ONLY.

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STRENGTH DATA
BOWEN JAR INTENSIFIERS

Intensifier Assy.	O.D. in	I.D. in	Connection	Stroke in	Rec'd. Drill Collar Weight Range lbs	Pull Load To Open Fully lbs	Min. Pull Req'd lbs	Calculated Strength Data			Fluid Capacity Gals	Used With Jar No.	Used With Super Fishing Jar No.
								Tensile @ Yield lbs	Torque Recommended ft.lb	Torque Yield ft.lb			
70957	1 5/8	1/4	Per Order	6	1100 - 1400	14,000	8,400	43,200 46,300	200	420	.13	708222	-
64460	1 13/16	5/16	1 13/16 Wilson F.J.	6	1,360 - 1800	18,100	10,800	59,400	370	460	.195	21150 74223 78074	-
50640	2 1/4	3/8	1 1/4 Reg.	8	1,560 - 2,100	20,700	13,800	118,500	1,700	2,200	.211	18775 54020	-
68262	2 29/32	1	2 3/8 PH6	12 3/4	2,200 - 3,000	37,000	24,600	194,800	1,600	5,200	.692	68010	-
55867	3 1/8	1	2 3/8 Reg.	8 3/4	2,400 - 3,300	30,000	21,000	229,200	3,500	7,600	.375	42736 52504	72888
55895	3 3/4	1 1/4	2 3/8 A.P.I. Reg.	8 1/4	4,200 - 5,700	52,000	36,000	345,000	3,800	13,500	.82	38040 13255 52506	145737
55747	3 3/4	1 1/2	2 3/8 I.F.	7 7/8	3,400 - 4,600	43,500	30,000	299,700	3,800	13,000	.63	37406 52528	-
50660	3 3/4	1 7/8	2 3/8 EUE	7 5/8	3,500 - 4,700	43,000	30,000	179,500	2,500	8,200	.613	41355 20150 52497	-
55664	4 1/4	1 15/16	2 7/8 A.P.I. I.F.	8 5/8	3,500 - 4,700	43,000	30,000	430,300	6,600	24,500	.92	44483 13640 52502	80468

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STRENGTH DATA
BOWEN JAR INTENSIFIERS…(continued)

Intensifier Assy.	O.D. in	I.D. in	Connection	Stroke in	Rec'd. Drill Collar Weight Range lbs	Pull Load To Open Fully lbs	Min. Pull Req'd lbs	Calculated Strength Data			Fluid Capacity Gals	Used With Jar No.	Used With Super Fishing Jar No.
								Tensile @ Yield lbs	Torque Recommended ft.lb	Torque Yield ft.lb			
50708	4 1/2	2 3/8	2 7/8 EUE	10 3/8	3,600 - 4,900	49,000	32,000	375,000	4,000	25,900	1.15	35849 52653	-
50700	4 3/4	1 1/2	3 1/2 F.H.	8 7/8	6,300 - 8,500	78,000	54,000	591,900	9,500	27,600	1.0	25960 52530	-
55812	4 3/4	2	3 1/2 F.H.	10 1/8	5,600 - 7,500	63,000	43,000	468,800	9,500	27,100	1.35	38110 52500	79789
55860	6	2	4 1/2 F.H.	8 5/8	10,200 - 13,800	128,500	77,000	937,000	17,000	52,600	1.57	14710 52498	145484
55905	6 1/4	2 1/4	4 1/2 I.F.	13	11,800 - 16,000	147,000	102,000	917,400	21,000	56,900	4.25	12370 52544	79691
50720	6 3/4	2 3/8	5 1/2 Reg.	13	13,000 - 17,500	172,900	102,000	1,013,800	24,000	74,200	3.45	11130 52680	145440
55910	7 3/4	3 1/16	6 5/8 Reg.	13	11,000 - 15,000	126,000	88,000	1,587,900	45,000	145,300	4.65	15160 52711	-
**78964	7 3/4	3 1/16	6 5/8 Reg.	12	12,100 - 20,500	220,000	123,000	1,600,000	45,500	130,000	-	-	72978
*66372	9	3 3/4	7 5/8 Reg.	13	12,000 - 16,000	200,000	100,000	1,621,000	70,000	224,700	3.2	66346	-

* The strengths shown are theoretical calculations based on yield strength of the material used in each case. The strengths shown are therefore accurate plus or minus 20% of the figure shown, only. These figures do not constitute a guarantee actual or implied; they are meant to service as a guide only, and appropriate allowance must be made in use, as a safety factor.

** **Bowen Super Intensifier** - Information provided upon request.

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BOWEN CUSHION SUB SPECIFICATIONS

Cushion Sub Assembly No.	4 3/4" O.D. 81454	6" O.D. 81183	6 1/2" O.D. 80891	8" O.D. 80927	9" O.D. 81300	11" O.D. 102165
O.D. Range (in)	4 3/4 - 5 1/4	6 - 6 1/4	6 1/2 - 7	8 - 8 1/2	9 - 9 1/2	11 - 12
I.D. (in)	1 1/2	1 3/4	2 1/4	2 1/2	2 3/4	3 1/16
Connection	3 1/2 Reg	4 1/2 Reg	4 1/2 Reg	6 5/8 Reg	6 5/8 Reg or 7 5/8 Reg	7 5/8 Reg or 8 5/8 Reg
Length Maximum Load	14 ft. 7 3/4 in. 60,000 lb	14 ft. 76,000 lb	14 ft. 78,000 lb	15 ft 4 1/4 in. 110,000 lb	15 ft 2 1/8 in. 120,000 lb	18 ft. 3 7/8 in. 120,000 lb
Maximum Stroke Torque to Yield	6.0 in 30,500 ft.lb	8.0 in 47,800 ft.lb	8.0 in 84,000 ft.lb	8.0 in 200,000 ft.lb	6.0 in 200,000 ft.lb	8.0 in 286,000 ft.lb
Lift Load (lbf)	475,000	495,000	720,000	1,500,000	1,500,000	2,100,000
Fluid Volume	165 in^3	225 in^3	275 in^3	360 in^3	515 in^3	707 in^3
Temp Range	To 400° F	To 400° F	To 400° F	To 400° F	To 400° F	To 400° F
Spring Rate	21,000 lb.in	28,000 lb.in	28,000 lb.in	28,000 lb.in	38,000 lb.in	38,000 lb.in

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TEST LOAD CHART

Cushion Sub Size - O.D.	Test Load
4 3/4" - 5 1/4"	60,000 lbs
6" - 6 1/4"	76,000 lbs
6 1/2" - 7"	78,000 lbs
8" - 8 1/2"	110,000 lbs
9" - 9 1/2"	120,000 lbs
11" - 12"	120,000 lbs

Do not exceed the load rating in the jar tester. Overload may damage the tool. Do not attempt to close the tool completely when testing.

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BOWEN HYDRO-MECHANICAL DRILLING JAR

SPECIFICATIONS

Size Connection		3-1/2 I.F.	4-1/2 Full Hole & X-Hole	4-1/2 I.F.	5-1/2 Reg.	6-5/8 Reg.
Minimum O.D. - inches		4-3/4	6	6-1/4	6-3/4	7-3/4
I.D. - inches		2	2-1/4	2-3/4	2-1/2	3-1/16
Length (Up Jar & Down Jar Assemblies Connected - Open)		33' - 5-3/4' '	37' - 5' '	35' - 9-1/2' '	36' - 3-3/4' '	37' - 7' '
Torsional Yield in Lb./Ft. (Mandrel Splines)		33,000	64,000	75,000	90,000	122,000
Tensile Load Yield Capacity in Tons		270	320	375	620	650
Complete Assembly Consisting of:	Part No. Weight	71902 1619	73182 2856	71556 2513	79114 3413	71614 4765
Up Jar Assembly	Part No. Weight	71903 819	72143 1494	71528 1239	78654 1708	71920 2470
Length (Open)		17' - 8-1/4' '	19' - 7-1/2' '	18' - 5' '	18' - 6-3/4' '	19' - 6-1/4' '
Total Stroke - inches		12	13-1/2	13-1/2	13-1/2	14-1/2
Down Jar Assembly	Part No. Weight	71916 800	72292 1362	71552 1274	79122 1705	71925 2295
Length (Open)		15' - 9-1/2' '	17' - 9-1/2' '	17' - 4-1/2' '	17' - 9' '	18' - 3/4' '
Total Stroke - Inches		7	7-1/2	7	7	7

Size Connection		7-5/8 A.P.I. Reg.
Minimum O.D. (Inches)		9
I.D. (Inches)		3-1/16
Length (Up Jar & Down Jar Assemblies - Open Connected)		41' - 6-1/2' '
Torsional Yield In Lb./Ft.		271,266
Tensile Load Yield Capacity in Lbs.		1,936,000
Complete Assembly Consisting Of:	Part No.	102074
Up Jar Assembly	Part No.	102072
Length (Open)		19' - 11-1/2' '
Total Stroke (inches)		14"
Down Jar Assembly	Part No.	102073
Length (Open)		21' - 7' '
Total Stroke (inches)		12"

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BOWEN HYDRO-MECHANICAL DRILLING JAR

STRENGTH DATA MECHANICAL DOWN JARS

Assembly Part Number	Diameter (Inches)		Threaded Connection	Lift Load (Tons*)	**Final Setting For Field Use (Tons)	Standard Load For Testing (Tons*) Shop Only	Full Stroke Length (Inches)
	Outside (Nominal)	Inside					
102073	9	3-1/16	7-5/8" Reg.	871	16	30	12
71925	7-3/4	3-1/16	6-5/8" Reg.	437	7-1/2	30	7
79122	6-3/4	2-1/2	5-1/2" Reg.	410	7-1/2	30	7
71983	6-1/4	2-3/4	4-1/2" I.F.	338	6	30	7
72292	6	2-1/4	4-1/2" F.H. 4-1/2" X-Hole	332	6	30	7-1/2
71916	4-3/4	2	3-1/2" I.F.	149	5	15	7

*2000 Lbs per ton

** These field use setting loads are chosen to provide a good trip load over a wide range of hole conditions. There is a tendency, however, for the load required to trip to increase with depth and mud weight. It may be necessary in deeper holes to increase the trip load at a faster rate.

It should also be noted that down jar trips are often difficult to observe on the rig floor.

STRENGTH DATA HYDRAULIC UP JARS

Assembly Part Number	Threaded Connection	Diameter (Inches)		Lift Load After Jarring (Tons*)	Maximum Recommended Jar Load (Tons*)	"Low" Pull Load (Tons*)	Standard Test Load (Tons*)	Lowest Allowable Test Load (Tons*)	Full Stroke Length (Inches)
		Outside (Nominal)	Inside						
102072	7-5/8" Reg.	9	3-1/16	955	250	20	50	50	14
71920	6-5/8" Reg.	7-3/4	3-1/16	663	150	15	50	40	14-1/2
78654	5-1/2" Reg.	6-3/4	2-1/2	468	110	12	50	40	13-1/2
71528	4-1/2" I.F.	6-1/4	2-3/4	400	85	10	50	35	13-1/2
72143	4-1/2" F.H.	6	2-1/4	400	85	8	45	30	13-1/2
71903	3-1/2" I.F.	4-3/4	2	273	50	5	25	15	12

*2000 lbs. per ton

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BOWEN HYDRO-MECHANICAL DRILLING JAR

JAR O.D.	TYPE JAR	AREA - IN.^{2}
4-3/4"	Up Jar	6.5
	Down Jar	9.6
6"	Up Jar	9.6
	Down Jar	15.9
6-1/4"	Up Jar	12.1
	Down Jar	18.2
6-3/4"	Up Jar	12.1
	Down Jar	19.7
7-3/4"	Up Jar	16.8
	Down Jar	28.3
9"	Up Jar	19.2
	Down Jar	37.1

PUMP OPEN AREAS

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BOWEN LUBRICATED FISHING BUMPER SUB STRENGTH DATA

Assembly Number	O.D.	I.D.	Connection	Tensile Strength (Yield) lbs	Torque (Ft.lb)	
					Bumper Sub	Drill Pipe (Spang Data)
54781	1 13/16"	3/8"	1 13/16" Wilson FJ	75,400	740	-
41490	2 1/4"	3/8"	1 1/4" API Reg	116,415	1,740	-
43501	3 1/8"	1"	2 3/8" API Reg	239,070	3,400	7,580
43470	3 3/4"	1 1/2"	2 3/8" API-IF	300,750	7,100	7,580
43521	3 3/4"	1 7/8"	2 3/8" EUE	291,735	4,920	4,440
43509	3 3/4"	1 1/4"	2 7/8" API Reg	363,780	7,100	14,020
43531	4 1/4"	1 15/16"	2 7/8" API-IF	397,650	9,260	14,020
42700	4 1/2"	2 3/8"	2 7/8" EUE	388,650	7,100	7,450
39727	4 5/8"	2"	3 1/2" API-FH	484,650	11,030	25,580
39727	4 3/4"	2"	3 1/2" API-FH	484,650	15,000	25,580
39732	5 3/4"	2 13/16"	4 1/2" API-FH	622,295	23,000	44,770
39732	6"	2 13/16"	4 1/2" API-FH	622,295	23,000	44,770
39737	6 1/4"	3 1/8"	4 1/2" API-IF	777,150	32,600	44,770
39778	6 3/4"	2 3/4"	5 1/2" API Reg	1,130,400	43,200	68,630
39752	7 3/4"	3 1/2"	6 5/8" API Reg	1,276,950	62,400	85,630

Strengths shown are theoretical calculations based on yield strength of the material used in each case. The strengths shown are therefore accurate, plus or minus 20% of the figure shown, only.
These figures do not constitute a guarantee, actual or implied; they are meant to serve as a guide only, and appropriate allowance must be made in use, as a safety factor.

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SPECIFICATIONS

BOWEN LUBRICATED FISHING BUMPER SUBS

Size Connections	1-13/16 Wilson F.J.	1-1/4 A.P.I. Reg.	2-3/8 A.P.I. Reg.	2-7/8 A.P.I. Reg.	2-3/8 A.P.I. I.F.	2-3/8 E.U.E.	2-7/8 A.P.I. I.F.
Outside Diameter - Inches	1-13/16	2-1/4	3-1/8	3-3/4	3-3/4	3-3/4	4-1/4
Inside Diameter - Inches	3/8	3/8	1	1-1/4	1-1/2	1-7/8	1-15/16
Stroke - Inches	10	10	15-1/2	15-1/2	15-1/2	15-1/2	15-1/2
Full Bore	No	No	Yes	Yes	Yes	Yes	yes
Complete Assembly:							
Part No.	54781	41490	43501	43509	43470	43521	43531
Weight	50	70	209	254	250	294	294

Size Connections	2-7/8 E.U.E.	3-1/2 A.P.I. F.H. or I.F.	4-1/2 A.P.I. F.H.	4-1/2 A.P.I. F.H. or I.F.	5-1/2 A.P.I. Reg.	6-5/8 A.P.I. Reg.
Outside Diameter - Inches	4-1/2	4-3/4	6	6- 1/4	6-3/4	7-3/4
Inside Diameter - Inches	2-3/8	2	2-13/16	3-1/8	2-3/4	3-1/2
Stroke - Inches	15-1/2	15-1/2	18	18	18	18
Full Bore	Yes	No	Yes	No	No	No
Complete Assembly:						
Part No.	42700	39727	39732	39737	39778	39752
Weight	304	333	560	565	700	816

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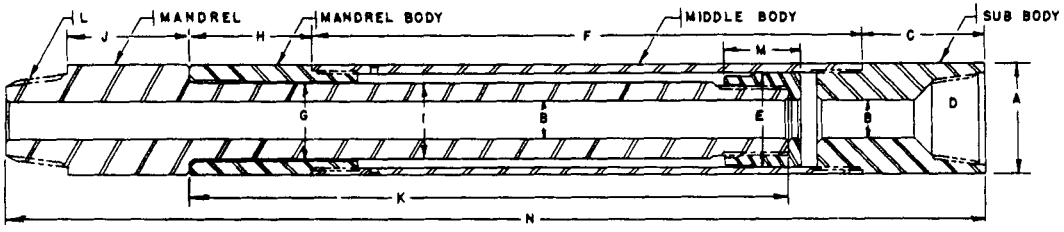

BOWEN FISHING BUMPER SUB

PRINCIPAL DIMENSIONS

Part	Sub Body				Middle Body			Mandrel Body			Mandrel					Knocker			
Key	A	B	C	D	A	E	F	A	G	H	I	B	J	K	L	E	B	M	N
Name	O.D.	I.D. Hole	Outside Length	Con-nection	O.D.	I.D.	Outside Length	O.D.	I.D. (Hex)	Outside Length	O.D. (Hex)	I.D. Hole	Outside Length	Length (Hex)	Connection	O.D.	I.D. Hole	Length	Overall Length
Symbol No. 10120 1-1/4'' Ext. Flush	1-13/16''	3/8''	4''	1-1/4'' Ext.FL.	1-13/16''	1-15/32''	28-1/2''	1-13/16''	1-1/32''	3''	1-5/32''	3/8''	3-5/16''	28-1/8''	1-1/4'' Ext. FL.	1-7/16''	3/8''	4-9/16''	41-3/4''
Symbol No. 18785 1-1/4'' API-Reg.	2-1/4''	7/16''	5-11/16''	1-1/4'' A.P.I.-Reg.	2-1/4''	1-3/4''	27-5/16''	2-1/4''	1-31/64''	2-9/16''	1-29/64''	7/16''	5-1/2''	26-3/16'	1-1/4'' API-Reg.	1-47/64''	1-1/''	3-1/4''	43-9/16''
Symbol No. 10175 2-3/8'' Ext. Flush	2-1/2''	1/2''	4''	2-3/8'' EXT. FL.	2-1/2''	2''	28-1/2''	2-1/2''	1-15/32''	3''	1-21/32''	1/2''	4''	28-1/8''	2-3/8'' EXT. FL.	1-63/64''	1/2''	4-9/16''	42''
Symbol No. 10105 2-3/8'' API-Reg.	3-5/32''	1''	6''	2-3/8'' A.P.I.-Reg.	3-5/32''	2-39/64''	31-3/8''	3-5/32''	1-29/32''	6''	2-5/32''	1''	6''	33-1/8''	2-3/8'' API-Reg.	2-37/64''	1''	5-1/8''	52-3/8''
Symbol No. 10190 2-3/8'' API-I.F.	3-3/8''	1''	6''	2-3/8'' A.P.I.-I.F.	3-3/8''	2-13/16''	31-3/8''	3-3/8''	2-1/32''	6''	2-5/16''	1''	6''	33-1/8''	2-3/8'' A.P.I.-I.F.	2-51/64''	1''	5-1/8''	52-3/8''
Symbol No. 10090 2-7/8'' API-Reg.	3-3/4''	1-1/4''	6''	2-7/8'' A.P.I.-Reg.	3-3/4''	3-3/32''	31-3/8''	3-3/4''	2-5/32''	6''	2-29/64''	1-1/14''	6''	33-1/8''	2-7/8'' API-Reg.	3-5/64''	1-1/14''	5-1/8''	52-7/8''
Symbol No. 10210 2-7/8'' API-I.F.	4-1/8''	1-1/2''	6''	2-7/8'' A.P.I.-I.F.	4-1/8''	3-7/16''	31-3/8''	4-1/8''	2-17/32''	6''	2-57/64''	1-1/2''	6''	33-1/8''	2-7/8'' A.P.I.-I.F.	3-27/64''	1-1/2''	5-1/8''	52-7/8''
Symbol No. 10155 3-1/2'' API-Reg.	4-1/4''	1-1/2''	8''	3-1/2'' A.P.I.-Reg.	4-1/4''	3-39/64''	31-3/8''	4-1/8''	2-23/32''	8''	3-7/64''	1-1/2''	8''	35-1/8''	3-1/2'' API-Reg.	3-37/64''	1-1/2''	4-7/8''	59-1/8''

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BOWEN FISHING BUMPER SUB

PRINCIPAL DIMENSIONS

Part	Sub Body				Middle Body			Mandrel Body			Mandrel					Knocker			
Key	A	B	C	D	A	E	F	A	G	H	I	B	J	K	L	E	B	M	N
Name	O.D.	I.D. Hole	Outside Length	Con-nection	O.D.	I.D.	Outside Length	O.D.	I.D. (Hex)	Outside Length	O.D. (Hex)	I.D. Hole	Outside Length	Length (Hex)	Connection	O.D.	I.D. Hole	Length	Overall Length
Symbol No. 10170 3-1/2" API-F.H.	4-5/8''	1-1/2''	8''	3-1/2'' A.P.I.-F.H.	4-5/8''	3-39/64''	31-3/8''	4-5/8''	2-23/32''	8''	3-7/64''	1-1/2''	8''	35-1/8''	3-1/2'' A.P.I.-F.H.	3-37/64''	1-1/2''	4-7/8''	59-1/8''
Symbol No. 10225 3-1/2" API-I.F.	4-3/4''	1-1/2''	8''	3-1/2'' A.P.I.-I.F.	4-3/4''	3-15/16''	31-3/8''	4-3/4''	2-27/32''	8''	3-5/16''	1-1/2''	8''	35-1/8''	3-1/2'' A.P.I.-I.F.	3-59/64''	1-1/2''	5-1/8''	59-3/8''
Symbol No. 10235 4-1/2" API-Reg.	5-1/2''	2''	8''	4-1/2'' A.P.I.-Reg.	5-1/2''	4-25/32''	31-3/8''	5-1/2''	3-17/32''	8''	4-3/64''	2''	8''	35-1/8''	4-1/2'' API-Reg.	4-49/64''	2''	5-1/8''	59-5/8''
Symbol No. 10135 4-1/2" API-.F.H.	5-3/4''	2''	8''	4-1/2'' A.P.I.-F.H.	5-3/4''	4-63/64''	31-3/8''	5-3/4''	3-17/32''	8''	4-3/64''	2''	8''	35-1/8''	4-1/2'' A.P.I.-F.H.	4-61/64''	2''	5-1/8''	59-3/8''
Symbol No. 10135 4-1/2" API-IF.	6-1/8''	2-1/4''	8''	4-1/2'' A.P.I.-I.F.	6-1/8''	5-9/32''	31-3/8''	6-1/8''	3-25/32''	8''	4-21/64''	2-1/4''	8''	38-1/8''	4-1/2'' A.P.I.-I.F.	5-1/4''	2-1/4''	5-1/8''	59-7/8''
Symbol No. 10690 5-1/2" API-Reg.	6-3/4''	2-3/4''	10''	5-1/2'' A.P.I.-Reg.	6-3/4''	5-3/4''	34-5/8''	6-3/4''	4-5/32''	8''	4-49/64''	2-3/4''	10''	36-7/8''	5-1/2'' API-Reg.	5-47/64''	2-3/4''	5-1/8''	67-3/8''
Symbol No. 26595 6-5/8" API-Reg.	7-3/4''	3-1/2''	9-29/32''	6-5/8'' A.P.I.-Reg.	7-3/4''	6-3/4''	35-1/8''	7-3/4''	5-11/64''	7-13/32''	5-1/8''	3-1/2''	9-3/4''	51-5/8''	6-5/8'' API-Reg.	6-47/64''	3-1/2''	5-1/8''	67-3/16''
Symbol No. 61596 7-5/8" API-Reg.	9''	4''	11-1/2''	7-5/8'' A.P.I.-Reg.	9''	7-5/8''	36-3/4''	9''	5-63/64''	7-1/2''	5-15/16''	4''	12''	37-3/4''	7-5/8'' API-Reg.	7-39/64''	4''	6-1/4''	73''

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LEE OILFIELD COMPOUNDERS

GENERAL INFORMATION

The Lee Oilfield Compounder is designed to increase the jarring effect when jarring, also enabling effective jarring in shallow well conditions. It is recommended that 3 to 6 drill collars be run between the jars and the compounder with the compounder on top of the drill collars, and the jars on the bottom.

Connection	O.D.	I.D.	Load To Open Fully	Body Joint Torque
2-3/8' ' Reg.	3-1/8' ' **79.5 mm**	1' ' **25.4 mm**	32,000 Lb. **14,500 daN**	1,500 Ft/Lb. **2,040 N.m.**
2-7/8' ' Reg.	3-3/4' ' **117 mm**	1-1/4' ' **32 mm**	48,000 Lb. **21,800 daN**	2,500 Ft/Lb. **3,400 N.m.**
3-1/2' ' I.F.	4-3/4' ' **120.5 mm**	2' ' **51 mm**	60,000 Lb. **27,300 daN**	7,000 Ft/Lb. **9,520 N.m.**
4-1/2' ' H90	6-1/4' ' **159 mm**	2-1/4' ' **57 mm**	150,000 Lb. **68,000 daN**	15,000 Ft/Lb. **20,400 N.m.**
5' ' H90	6-3/4' ' **165 mm**	2-1/2' ' **63.5 mm**	170,000 Lb. **77,000 daN**	25,000 Ft/Lb. **34,000 N.m.**
7' ' H90	9' ' **228 mm**	2-1/2' ' **63.5 mm**	200,000 Lb. **91,000 daN**	50,000 Ft/Lb. **68,000 N.m.**

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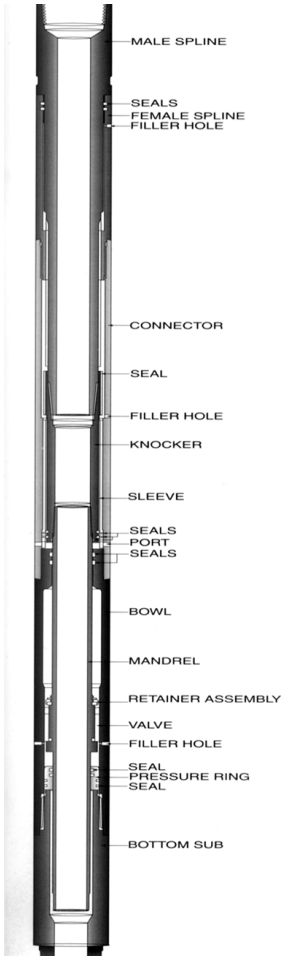
LEE OILFIELD SJ TYPE FISHING JARS

Lee SJ type jar is designed to be used in snubbing situations. Lee Oilfield hydraulic jars have been designed to provide maximum bore's where necessary and incorporate such important features as:

- the inner jarring mechanism is not exposed to torsional stresses,
- the design incorporates a self compensating pressure ring,
- floating sleeve valve enabling rapid resetting without damage to a jar,
- floating sleeve valve provides for a uniform hydraulic bypass thus eliminating frictional heat problems,
- a 4-1/2 inch, free stroke is provided for maximum impact,
- internal spline system for snubbing operations.



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LEE SJ TYPE FISHING JARS

Size		Conn	Jarring Load		Tensile Yield	Body Joint
O.D.	I.D.		Recomm	Ulitmate	After Jarring	Torque
2 1/8"	3/4"	2" LDC	12000 lbs.	14,500 lbs.	86,000 lbs.	600 ft. lbs.
53.9 mm	**19.0 mm**		**5,300 daN**	**6,400 daN**	**38,000 daN**	**813 Nm.**
2 1/4"	3/4"	2" LDC	15,000 lbs.	17,500 lbs.	86,000 lbs.	700 ft. lbs.
57.1 mm	**19.0 mm**		**6,600 daN**	**7,700 daN**	**38,000 daN**	**950 Nm.**
2 1/4"	3/8"	2" LDC	17,000 lbs.	19,000 lbs.	115,000 lbs.	700 ft. lbs.
57.1 mm	**9.5 mm**		**7,500 daN**	**8,400 daN**	**51,000 daN**	**950 Nm.**
3 1/8"	1"	2 3/8" REG	35,000 lbs.	45,000 lbs.	210,000 lbs.	1,800 ft. lbs.
79.4 mm	**25.4 mm**		**15,500 daN**	**20,000 daN**	**93,000 daN**	**2,400 Nm.**
3 3/4"	1 1/4"	2 7/8" REG	60,000 lbs.	66,000 lbs.	320,000 lbs.	3,000 ft. lbs.
95.2 mm	**31.8 mm**	2 3/8" IF	**26,600 daN**	**29,300 daN**	**142,000 daN**	**4,000 Nm.**
3 3/4"	1 7/8"	2 3/8" EUE	46,500 lbs.	60,000 lbs.	220,000 lbs.	3,000 ft. lbs.
95.2 mm	**47.6 mm**		**20,600 daN**	**26,600 daN**	**97,600 daN**	**4,000 Nm.**
4 1/8"	1 3/4"	2 7/8" IF	53,000 lbs.	60,000 lbs.	355,000 lbs.	4,000 ft. lbs.
104.8 mm	**44.5 mm**		**23,500 daN**	**26,600 daN**	**157,600 daN**	**5,400 Nm.**
4 1/2"	2 3/8"	2 7/8" EUE	49,000 lbs.	60,000 lbs.	400,000 lbs.	4,000 ft. lbs.
114.3 mm	**60.3 mm**		**21,700 daN**	**26,600 daN**	**177,600 daN**	**5,400 Nm.**
4 3/4"	2"	3 1/2" IF	80,000 lbs.	90,000 lbs.	505,000 lbs.	7,000 ft. lbs.
120.6 mm	**50.8 mm**		**35,500 daN**	**40,000 daN**	**224,000 daN**	**9,500 Nm.**
4 3/4"	2 1/4"	3 1/2" IF	75,000 lbs.	80,000 lbs.	306,000 lbs.	7,000 ft. lbs.
120.6 mm	**57.1 mm**		**33,300 daN**	**35,500 daN**	**136,000 daN**	**9,500 Nm.**
6 1/4"	2 1/4"	4 1/2" FH	160,000 lbs.	190,000 lbs.	750,000 lbs.	15,000 ft. lbs.
158.8 mm	**57.1 mm**	4 1/2" IF	**71,000 daN**	**84,300 daN**	**333,000 daN**	**20,400 Nm.**
6 3/4"	2 1/2"	5 1/2" REG	170,000 lbs.	200,000 lbs.	800,000 lbs.	20,000 ft. lbs.
171.4 mm	**63.5 mm**	5" H-90	**74,500 daN**	**88,800 daN**	**355,000 daN**	**27,100 Nm.**
8"	2 3/4"	6 5/8" REG	215,000 lbs.	250,000 lbs.	1,200,000 lbs.	46,000 ft. lbs.
203.2 mm	**69.9 mm**		**95,500 daN**	**111,000 daN**	**533,000 daN**	**62,300 Nm.**
9"	2 3/4"	7" H-90	230,000 lbs.	280,000 lbs.	1,200,000 lbs.	50,000 ft. lbs.
228.6 mm	**69.9 mm**		**102,000 daN**	**124,300 daN**	**533,000 daN**	**68,000 Nm.**

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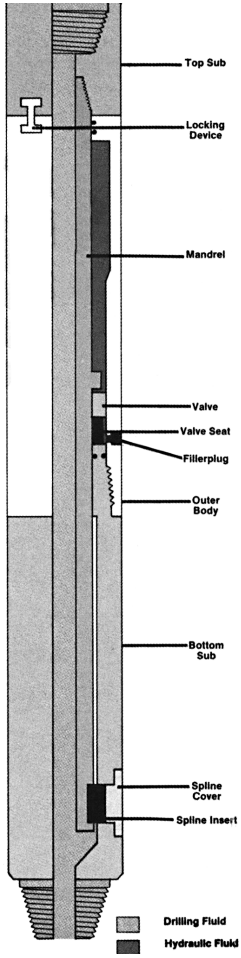
LEE OILFIELD
SURFACE JAR
OPERATION

The Lee Oilfield Surface Jar is a staight pull hydraulic jar. The correct operating procedure can be achieved by pulling the Jar to shear the locking device (22,000 lbs.) removing the slips and then pulling to the desired jarring load. Wait for the jar to fire, there is a short restricted stroke to be pulled through, when the jar releases, it will free fall 48". If the jar is firing too slowly, the jarring time can be decreased by closing the jar just enough to achieve the desired amount of restricted stroke, causing a shorter delay before the jar releases.

Tool Dimensions: 5-1/2" Reg. Conn.

177.8 mm O.D. x 51 mm I.D.	-	7" O.D. x 2" I.D.
4 meters	-	13 feet
Maximum Jarring Loads:	-	66,750 daN
	-	150,000 lbs.
Shipping Weight	-	1200 lbs.



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NATIONAL OILWELL (GRIFFITH) FISHING JAR

NOMINAL SIZE	in.	1.81	2.25	3.12	3.75	4.12	4.25	4.75	5.00	5.75	6.25	6.50	6.75	7.75	8.75
	mm	**46**	**57**	**79**	**95**	**105**	**108**	**121**	**127**	**146**	**159**	**165**	**171**	**197**	**222**
SERIES		**320**	**317**	**318**	**321**	**315**	**363**	**313**	**368**	**325**	**306**	**476**	**308**	**323**	**324**
ID	in.	0.31	0.38	1.00	1.25	1.50	1.50	2.00	2.25	2.00	2.25	2.25	2.50	2.75	2.75
	mm	**8**	**10**	**25**	**32**	**38**	**38**	**51**	**57**	**51**	**57**	**57**	**64**	**70**	**70**
LENGTH	feet	4.2	5.5	5.9	7.8	7.8	6.3	8.3	8.3	7.4	7.8	7.8	7.8	7.8	7.8
	m	**1.3**	**1.7**	**1.8**	**2.4**	**2.4**	**1.9**	**2.5**	**2.5**	**2.3**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**
WEIGHT	lbs	30	60	120	230	280	240	400	440	520	650	700	750	990	1,280
	kg	**10**	**30**	**50**	**100**	**130**	**110**	**180**	**200**	**240**	**290**	**320**	**340**	**450**	**580**
JARRING	in.	3.0	3.0	4.5	4.8	5.3	4.5	4.8	4.8	5.0	5.0	5.0	5.3	5.0	5.3
STROKE	mm	**76**	**76**	**114**	**121**	**133**	**114**	**121**	**121**	**127**	**127**	**127**	**133**	**127**	**133**
TOTAL STROKE	in.	5.0	6.0	7.5	10.3	9.3	8.8	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
	mm	**127**	**152**	**191**	**260**	**235**	**222**	**235**	**235**	**235**	**235**	**235**	**235**	**235**	**235**
MAX. LOAD	lbf	19,000	21,000	33,000	57,000	57,000	63,000	85,000	70,000	109,000	160,000	160,000	190,000	210,000	240,000
DURING	daN	**8,400**	**9,300**	**14,600**	**25,300**	**25,300**	**2,800**	**38,000**	**31,000**	**48,000**	**71,000**	**71,000**	**84,000**	**93,000**	**106,000**
HYD. DELAY															
MAX. TENSILE	lbf	59,000	92,000	178,000	219,000	257,000	257,000	380,000	284,000	566,000	690,000	690,000	826,000	977,000	1,486,000
LOAD AFTER	daN	**26,000**	**41,000**	**79,000**	**97,000**	**114,000**	**114,000**	**169,000**	**126,000**	**251,000**	**306,000**	**306,000**	**367,000**	**434,000**	**660,000**
JARRING															
MAX. TORSIONAL	ft.lb	960	2,300	5,200	8,100	11,000	11,000	14,000	12,000	28,000	34,000	34,000	44,000	80,000	101,000
LOAD	N.m	**1,300**	**3,100**	**7,100**	**11,000**	**15,000**	**15,000**	**19,000**	**16,000**	**38,000**	**46,000**	**46,000**	**60,000**	**109,000**	**137,000**
(TO YIELD BODY CONN)															
PUMP OPEN	in^2	0.7	0.7	2.3	3.1	4.4	4.4	6.2	7.1	9.0	10.3	10.3	11.0	27.0	15.9
AREA	cm^2	**4**	**4**	**15**	**20**	**29**	**29**	**40**	**46**	**58**	**67**	**67**	**71**	**174**	**103**

Specifications subject to change without notice

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NATIONAL OILWELL (GRIFFITH)
EXTREME SERVICE FISHING JAR

TOOL OD	in.	3.12	4.75	6.25
	mm	**79**	**121**	**159**
SERIES		**420**	**427**	**370**
TOOL ID	in.	1.00	2.00	2.25
	mm	**25**	**51**	**57**
LENGTH (OVERALL)	ft.	8.0	9.6	10.2
	m	**2.4**	**2.9**	**3.1**
WEIGHT	lbs	170	500	1,100
	kg	**80**	**230**	**500**
JARRING STROKE	in.	6.2	6.0	5.5
	mm	**157**	**152**	**140**
TOTAL STROKE	in.	9.5	10.0	10.0
	mm	**241**	**254**	**254**
MAXIMUM LOAD DURING	lbf	52,000	95,000	200,000
HYDRAULIC DELAY	**daN**	**23,000**	**42,000**	**89,000**
MAXIMUM TENSILE	lbf	240,000	360,000	790,000
LOAD AFTER JARRING	**daN**	**107,000**	**160,000**	**351,000**
MAXIMUM TORSIONAL LOAD	ft.lb	6,300	14,000	41,000
(TO YIELD BODY CONNS)	**N.m**	**9,000**	**19,000**	**56,000**
MAXIMUM TORSIONAL LOAD	ft.lb	10,400	40,000	64,000
(TO YIELD SPLINES)	**N.m**	**14,000**	**54,000**	**87,000**
PUMP OPEN AREA	in^2	1.8	6.5	9.6
	cm^2	**11**	**42**	**62**

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NATIONAL OILWELL (GRIFFITH) FISHING JAR INTENSIFIER

NOMINAL SIZE	in.	3.13	3.75	4.12	4.75	6.25	6.50	6.75	7.00	7.75	8.00	9.00
	mm	80	95	105	121	159	165	171	178	197	203	229
SERIES		395	374	326	327	310	399	397	398	366	356	357
ID	in.	1.00	1.25	1.50	1.50	2.25	2.25	2.50	2.50	2.81	2.81	2.75
	mm	25	32	38	38	57	57	64	64	71	71	70
LENGTH	feet	14.2	14.5	13.0	12.7	13.4	13.4	13.0	13.0	15.6	15.6	19.6
	m	4.3	4.4	4.0	3.9	4.1	4.1	4.0	4.0	4.8	4.8	6.0
WEIGHT	lbs	280	410	430	580	1,000	1,100	1,200	1,300	1,800	2,000	3,300
	kg	130	190	200	260	450	500	540	590	820	910	1 500
STROKE	in.	8.0	8.0	8.5	7.0	9.5	9.5	9.5	9.5	9.8	9.8	9.8
	mm	203	203	216	178	241	241	241	241	248	248	248
AXIAL LOAD	lbf	33,000	46,000	45,000	55,000	75,000	75,000	82,000	82,000	90,000	90,000	200,000
TO FULLY	daN	14,600	20,400	20,000	24,400	33,300	33,300	36,400	36,400	39,900	39,900	89,000
EXTEND TOOL												
MAX STATIC AXIAL	lbf	178,000	218,000	302,000	608,000	820,000	820,000	920,000	920,000	1,010,000	1,010,000	1,450,000
TENSILE LOAD	daN	79,000	97,000	134,000	270,000	364,000	364,000	408,000	408,000	448,000	448,000	644,000
MAX TORSIONAL LOAD	ft.lb	4,500	8,000	11,000	14,000	34,000	34,000	45,000	45,000	88,000	88,000	101,000
(TO YIELD BODY CONNS)	N.m	6,100	10,800	14,900	19,000	46,100	46,100	61,000	61,000	119,300	119,300	136,900

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NATIONAL OILWELL (GRIFFITH) FISHING BUMPER SUB

NOMINAL SIZE	in.	4.13	4.25	4.75	4.75	6.25	6.50	6.50	6.75	7.75	8.00	9.00	9.50
	mm	**105**	**108**	**121**	**121**	**159**	**165**	**165**	**171**	**197**	**203**	**229**	**241**
SERIES		**314**	**335**	**316**	**433**	**468**	**309**	**471**	**311**	**489**	**351**	**328**	**350**
ID	in.	1.50	1.50	1.50	2.00	2.25	2.25	2.50	2.50	3.00	3.00	3.00	3.00
	mm	**38**	**38**	**38**	**51**	**57**	**57**	**64**	**64**	**76**	**76**	**76**	**76**
LENGTH	feet	4.5	5.5	5.8	5.8	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
	m	**1.4**	**1.7**	**1.8**	**1.8**	**1.9**	**1.9**	**1.9**	**1.9**	**1.9**	**1.9**	**1.9**	**1.9**
WEIGHT	lbs	160	200	250	220	520	600	560	600	750	835	1,100	1,240
	kg	**70**	**90**	**110**	**100**	**240**	**270**	**250**	**270**	**340**	**380**	**500**	**560**
STANDARD STROKE	in.	20	20	20	20	20	20	20	20	20	20	20	20
	mm	**508**	**508**	**508**	**508**	**508**	**508**	**508**	**508**	**508**	**508**	**508**	**508**
MAX TENSILE LOAD	lbf	309,000	309,000	575,000	380,000	829,000	829,000	840,000	896,000	955,000	955,000	1,217,000	1,303,000
	daN	**137,000**	**137,000**	**255,000**	**169,000**	**368,000**	**368,000**	**373,000**	**398,000**	**424,000**	**424,000**	**540,000**	**578,000**
MAX TORSIONAL LOAD	ft.lb	8,900	10,000	15,000	13,600	32,000	32,000	44,000	43,000	51,000	51,000	65,000	147,000
(To yield body conns)	**N.m**	**12,100**	**13,600**	**20,300**	**18,400**	**43,400**	**43,400**	**59,700**	**58,300**	**69,100**	**69,100**	**88,100**	**199,300**

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NATIONAL OILWELL (GRIFFITH)
DOUBLE-ACTING HYDRAULIC/MECHANICAL DRILLING JAR

NOMINAL SIZE		in.	4.75	6.25	6.50	6.75	7.00	7.12	8.00	9.00	9.50
(+API DRILL COLLAR TOLERANCE)		**mm**	**121**	**159**	**165**	**171**	**178**	**181**	**203**	**229**	**241**
SERIES			**431**	**442**	**428**	**440**	**441**	**480**	**411**	**444**	**437**
MAX RECOMMENDED HOLE DIA.		in.	7 7/8	9 7/8	9 7/8	12 1/4	12 1/4	12 1/4	17 1/2	26	26
Hole openers not recommended.		**mm**	**200**	**251**	**251**	**311**	**311**	**311**	**445**	**660**	**660**
ID		in.	2.25	2.25	2.25	2.50	2.50	2.50	2.81	3.00	3.00
		mm	**57**	**57**	**57**	**64**	**64**	**64**	**71**	**76**	**76**
LENGTH (LATCHED)		ft.	19.8	22.5	22.5	23.0	23.0	23.0	22.5	23.0	23.0
		m	**6.0**	**6.9**	**6.9**	**7.0**	**7.0**	**7.0**	**6.9**	**7.0**	**7.0**
WEIGHT		lbs	850	2,000	2,100	2,250	2,450	2,450	3,100	4,600	5,200
		kg	**390**	**910**	**950**	**1,020**	**1,110**	**1,110**	**1,410**	**2,090**	**2,360**
STROKE UP		in.	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
(FREE STROKE)		**mm**	**152**	**152**	**152**	**152**	**152**	**152**	**152**	**152**	**152**
STROKE DOWN		in.	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
		mm	**152**	**152**	**152**	**152**	**152**	**152**	**152**	**152**	**152**
PRESET RELEASE UP	STD:	lbf	40,000	90,000	90,000	90,000	90,000	90,000	95,000	100,000	100,000
		daN	**18,000**	**40,000**	**40,000**	**40,000**	**40,000**	**40,000**	**42,000**	**44,000**	**44,000**
	MAX:	lbf	55,000	140,000	140,000	140,000	140,000	140,000	150,000	155,000	155,000
		daN	**24,000**	**62,000**	**62,000**	**62,000**	**62,000**	**62,000**	**67,000**	**69,000**	**69,000**
PRESET RELEASE DOWN	STD:	lbf	18,000	40,500	40,500	40,500	40,500	40,500	42,800	45,000	45,000
(TOLERANCE +/- 5%)		**daN**	**8,000**	**18,000**	**18,000**	**18,000**	**18,000**	**18,000**	**19,000**	**20,000**	**20,000**
	MAX:	lbf	27,000	63,000	63,000	63,000	63,000	63,000	67,500	69,800	69,800
		daN	**12,000**	**28,000**	**28,000**	**28,000**	**28,000**	**28,000**	**30,000**	**31,000**	**31,000**
MAX LOAD		lbf	84,000	160,000	160,000	190,000	190,000	190,000	300,000	350,000	350,000
DURING HYDRAULIC DELAY		**daN**	**37,000**	**71,000**	**71,000**	**85,000**	**85,000**	**85,000**	**130,000**	**160,000**	**160,000**
MAX TENSILE LOAD		lbf	362,000	755,000	755,000	823,000	823,000	1,000,000	1,000,000	1,225,000	1,225,000
AFTER JARRING		**daN**	**160,000**	**340,000**	**340,000**	**370,000**	**370,000**	**440,000**	**440,000**	**540,000**	**540,000**
MAXIMUM TORSIONAL LOAD		ft.lb	11,500	37,500	37,500	44,500	53,000	70,000	73,500	95,000	95,000
(TO YIELD BODY CONNS)		**N.m**	**15,600**	**50,800**	**50,800**	**60,300**	**71,900**	**94,900**	**99,700**	**128,800**	**128,800**
TORSIONAL LOAD		ft.lb	28,500	62,000	62,000	74,500	74,500	100,000	102,000	136,000	136,000
TO YIELD SPLINES		**N.m**	**38,600**	**84,100**	**84,100**	**101,000**	**101,000**	**135,600**	**138,300**	**184,400**	**184,400**
(REFERENCE ONLY)											
PUMP OPEN AREA		in^2	6.5	9.6	9.6	11.0	11.0	11.0	14.2	15.9	15.9
		cm^2	**42**	**62**	**62**	**71**	**71**	**71**	**92**	**103**	**103**

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NATIONAL OILWELL (GRIFFITH)
DRILLING JAR INTENSIFIERS TECHNICAL DATA

TOOL O.D.	in.	4 ¾	6¼ / 6½	8	9½
(+API DRILL COLLAR TOLERANCE)	**mm**	**121**	**159 / 165**	**203**	**241**
SERIES		**382**	**387**	**390**	**451**
I.D.	in.	1.50	2.25	2.81	3.00
	mm	**38**	**57**	**71**	**76**
LENGTH	ft.	13.9	14.7	14.9	16.2
	m	**4.23**	**4.48**	**4.54**	**4.93**
STROKE	in.	7	8	8	8
	mm	**178**	**203**	**203**	**203**
AXIAL LOAD TO FULLY	lbf	55,000	74,500	82,000	86,000
EXTEND TOOL	**daN**	**24,500**	**33,100**	**36,500**	**38,255**
TENSILE LOAD AT YIELD	lbf	608,000	820,000	942,000	1,225,000
	daN	**270,400**	**364,700**	**419,000**	**545,000**
MAX TORSIONAL LOAD	ft.lb	13,600	34,000	80,000	145,000
(To yield body connections)	**N.m**	**18,400**	**46,100**	**108,500**	**196,000**
WEIGHT	lbs	585	1,100	1,800	3,500
	kg	**270**	**500**	**800**	**1,600**

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NATIONAL OILWELL (GRIFFITH) HYDRAULIC/MECHANICAL DRILLING JAR

TOOL OD		in.	4.75	6.25	6.50	6.75	7.00	8.00	9.00	9.50
TOLERANCE)		**mm**	**121**	**159**	**165**	**171**	**178**	**203**	**229**	**241**
SERIES			**380**	**447**	**474**	**340**	**450**	**336**	**354**	**381**
MAX. REC. HOLE DIA.		in.	7 7/8	9 7/8	12 1/4	12 1/4	12 1/4	17 1/2	26	26
Hole openers not recomm.		**mm**	**200**	**251**	**311**	**311**	**311**	**445**	**660**	**660**
TOOL ID		in.	2.25	2.25	2.75	2.50	2.50	2.81	2.81	2.81
		mm	**57**	**57**	**70**	**64**	**64**	**71**	**71**	**71**
LENGTH (LATCHED)		ft.	12.7	16.3	18.5	15.0	15.0	15.0	15.0	15.0
		m	**3.9**	**5.0**	**5.6**	**4.6**	**4.6**	**4.6**	**4.6**	**4.6**
WEIGHT		lbs	550	1,300	1,500	1,400	1,540	2,100	2,700	3,000
		kg	**250**	**590**	**680**	**640**	**700**	**950**	**1,200**	**1,400**
STROKE UP		in.	4.0	4.5	6.0	4.5	4.5	5.0	5.0	5.0
(FREE STROKE)		**mm**	**102**	**114**	**152**	**114**	**114**	**127**	**127**	**127**
STROKE DOWN		in.	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
		mm	**102**	**152**	**152**	**152**	**152**	**152**	**152**	**152**
PRESET RELEASE UP	STD:	lbf	40,000	90,000	90,000	90,000	90,000	95,000	100,000	100,000
(DOWN =45% OF UP)		**daN**	**18,000**	**40,000**	**40,000**	**40,000**	**40,000**	**42,000**	**44,000**	**44,000**
	MAX:	lbf	55,000	140,000	140,000	140,000	140,000	150,000	155,000	155,000
		daN	**24,000**	**62,000**	**62,000**	**62,000**	**62,000**	**67,000**	**69,000**	**69,000**
MAX LOAD DURING		lbf	75,000	160,000	180,000	190,000	190,000	220,000	250,000	250,000
HYDRAULIC DELAY		**daN**	**33,000**	**71,000**	**80,000**	**85,000**	**85,000**	**98,000**	**111,000**	**111,000**
MAXIMUM TENSILE		lbf	354,000	755,000	865,000	828,000	828,000	965,000	1,225,000	1,225,000
LOAD AFTER JARRING		**daN**	**157,000**	**336,000**	**385,000**	**368,000**	**368,000**	**429,000**	**545,000**	**545,000**
MAX TORSIONAL LOAD		ft.lb	16,000	41,000	41,000	40,000	40,000	68,000	110,000	112,000
(TO YIELD BODY CONNS)		**N.m**	**22,000**	**56,000**	**56,000**	**54,000**	**54,000**	**92,000**	**149,000**	**152,000**
PUMP OPEN AREA		sq.in.	6.5	9.6	11.0	11.0	11.0	14.2	15.9	15.9
		sq.cm	**42**	**62**	**71**	**71**	**71**	**92**	**103**	**103**

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NATIONAL OILWELL (GRIFFITH) DOUBLE ACTING DRILLING JAR INTENSIFIERS TECHNICAL DATA

TOOL O.D.	in.	6.50	8.00	9.50
(+API DRILL COLLAR TOLERANCE)	**mm**	**165**	**203**	**241**
SERIES		**408**	**434**	**414**
MAX RECOMMENDED HOLE DIA.	in.	9 7/8	14 3/4	26
Hole openers not recomm.	**mm**	**251**	**375**	**660**
TOOL I.D.	in.	2.25	2.81	3.00
	mm	**57**	**71**	**76**
LENGTH	ft	20	20	20
	m	**6.1**	**6.1**	**6.1**
WEIGHT	lbs	1,750	3,000	4,000
	kg	**796**	**1,365**	**1,815**
STROKE UP	in.	8	8	8
	mm	**203**	**203**	**203**
STROKE DOWN	in.	8	8	8
	mm	**203**	**203**	**203**
AXIAL LOAD TO FULLY EXTEND	lbf	70,000	84,000	86,000
	daN	**31,130**	**37,360**	**38,255**
AXIAL LOAD TO FULLY COMPRESS	lbs	70,000	84,000	86,000
	daN	**31,130**	**37,360**	**38,255**
MAX TENSILE LOAD	lbf	755,000	1,050,000	1,225,000
	daN	**336,000**	**467,000**	**545,000**
MAX TORSIONAL LOAD	ft.lb	37,000	70,000	117,000
(To yield body conns)	**N.m**	**50,200**	**94,900**	**159,000**

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NATIONAL OILWELL (GRIFFITH) TEMPERATURE COMPENSATED SHOCK TOOL

TOOL OD	inches	4.75	6.25	6.50	6.75	7.00	8.00	8.00	9.00	9.50	10.00	11.00	12.00	14.00
(+API drill collar tolerance)	**mm**	**121**	**159**	**165**	**171**	**178**	**203**	**203**	**229**	**241**	**254**	**279**	**305**	**356**
SERIES		**155**	**146**	**150**	**147**	**154**	**148**	**160**	**139**	**151**	**138**	**157**	**143**	**113**
MAXIMUM RECOMM.														
HOLE DIAMETER	in.	6 3/4	8 1/2	8 1/2	8 3/4	8 3/4	12 1/4	12 1/4	13 3/4	17 1/2	17 1/2	17 1/2	17 1/2	26
Hole openers not recomm.	**mm**	**171.5**	**215.9**	**215.9**	**222.3**	**222.3**	**311.2**	**311.0**	**349.3**	**444.5**	**444.5**	**445**	**445**	**660**
TOOL ID	in.	2.00	2.00	2.00	2.25	2.25	2.50	2.75	2.81	2.81	2.81	2.81	2.81	3.00
	mm	**51**	**51**	**51**	**57**	**57**	**64**	**70**	**71**	**71**	**71**	**71**	**71**	**76**
LENGTH	ft.	8.5	9.4	9.4	9.4	9.4	9.4	12.5	9.4	10.8	10.8	14.0	12.2	15.0
	m	**2.59**	**2.87**	**2.87**	**2.87**	**2.87**	**2.87**	**3.81**	**2.87**	**3.29**	**3.29**	**4.27**	**3.72**	**4.57**
WEIGHT	lbs	375	720	800	850	930	1,200	1,600	1,500	2,200	2,300	3,200	3,400	5,200
	kg	**170**	**330**	**360**	**390**	**420**	**540**	**730**	**680**	**1,000**	**1,000**	**1,500**	**1,500**	**2,400**
AXIAL LOAD TO FULLY	lbf	74,000	100,000	100,000	100,000	100,000	125,000	125,000	110,000	100,000	100,000	100,000	100,000	140,000
COMPRESS TOOL	**daN**	**33,000**	**44,000**	**44,000**	**44,000**	**44,000**	**56,000**	**56,000**	**49,000**	**44,000**	**44,000**	**44,000**	**44,000**	**62,000**
TENSILE LOAD	lbf	380,000	555,000	555,000	593,000	593,000	770,000	872,000	853,000	1,207,000	1,042,000	808,000	1,337,000	1,865,000
AT YIELD	**daN**	**169,000**	**247,000**	**247,000**	**264,000**	**264,000**	**342,000**	**388,000**	**379,000**	**537,000**	**463,000**	**359,000**	**595,000**	**830,000**
MAX TORSIONAL LOAD	ft.lb	17,000	41,000	50,000	54,000	54,000	79,000	79,000	115,000	109,000	157,000	187,000	244,000	400,000
(To yield body conns)	**N.m**	**23,000**	**56,000**	**68,000**	**73,000**	**73,000**	**107,000**	**107,000**	**156,000**	**148,000**	**213,000**	**254,000**	**331,000**	**542,000**
PUMP OPEN AREA	sq.in.	11.0	15.9	15.9	17.7	17.7	23.8	30.7	30.7	38.5	41.3	11.0	11.8	12.6
	sq.cm	**71**	**103**	**103**	**114**	**114**	**154**	**198**	**198**	**248**	**266**	**71**	**76**	**81**
SPRING RATE	lbs/in.	29,000	35,000	35,000	35,000	35,000	35,000	31,000	35,000	25,000	25,000	15,000	15,000	22,000
	N/mm	**5,100**	**6,100**	**6,100**	**6,100**	**6,100**	**6,100**	**5,400**	**6,100**	**4,400**	**4,400**	**2,600**	**2,600**	**3,900**
OPENING TRAVEL	in.	1.00	1.75	1.75	1.75	1.75	1.75	1.75	1.75	3.30	3.30	2.5	2.5	2.0
	mm	**25**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**84**	**84**	**64**	**64**	**51**
CLOSING TRAVEL	in.	2.5	2.9	2.9	3.0	3.0	3.6	4.0	3.2	4.0	4.0	7.0	7.0	7.0
	mm	**64**	**74**	**74**	**76**	**76**	**91**	**102**	**81**	**102**	**102**	178	178	178

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NATIONAL OILWELL (GRIFFITH) BALANCED BUMPER SUBS TECHNICAL DATA

NOMINAL SIZE	in.	3.12	4.25	4.75	6.25	6.50	8.00
(+API DRILL COLLAR TOLERANCE)	**mm**	**79**	**108**	**121**	**159**	**165**	**203**
SERIES		**394**	**347**	**348**	**349**	**456**	**376**
MAX. RECOMMENDED HOLE DIA.	in.	6	6 3/4	7 7/8	9 7/8	12 1/4	17 1/2
Hole openers not recommended.	**mm**	**152**	**171**	**200**	**251**	**311**	**445**
ID	in.	1.00	1.94	2.00	2.25	2.25	3.00
	mm	**25**	**49**	**51**	**57**	**57**	**76**
LENGTH	ft.	8.0	9.2	9.7	9.7	19.7	20.4
	m	**2.4**	**2.8**	**3.0**	**3.0**	**6.0**	**6.2**
WEIGHT	lbs	190	300	410	690	1,550	2,600
	kg	**86**	**136**	**186**	**313**	**703**	**1,180**
STANDARD STROKE	in.	18	18	20	20	60	60
	mm	**457**	**457**	**508**	**508**	**1,520**	**1,520**
MAXIMUM TENSILE LOAD	lbf	142,000	162,000	394,000	577,000	577,000	853,000
	daN	**63,000**	**72,000**	**175,000**	**256,000**	**256,000**	**379,000**
MAXIMUM TORSIONAL LOAD	ft.lb	3,500	10,000	14,000	34,000	34,000	66,000
(To yield body connections)	**N.m**	**4,700**	**14,000**	**19,000**	**46,000**	**46,000**	**89,000**

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NATIONAL OILWELL (GRIFFITH) MECHANICAL DRILLING JARS

NOMINAL SIZE		in.	4.75	6.25	6.50	6.75	7.00	8.00	9.00	9.50
(+API DRILL COLLAR TOLERANCE)		**mm**	**121**	**159**	**165**	**171**	**178**	**203**	**229**	**241**
SERIES			**386**	**458**	**342**	**338**	**454**	**344**	**359**	**459**
MAX. RECOMMENDED HOLE DIA.		in.	7 7/8	9 7/8	9 7/8	12 1/4	12 1/4	17 1/2	26	26
(Hole openers not recommended.)		**mm**	**200**	**251**	**251**	**311**	**311**	**445**	**660**	**660**
ID		in.	2.00	2.25	2.25	2.50	2.50	2.81	2.81	3.00
		mm	**51**	**57**	**57**	**64**	**64**	**71**	**71**	**76**
LENGTH (LATCHED)		ft.	10.0	11.5	11.5	10.5	10.5	12.5	12.0	14.0
		m	**3.0**	**3.5**	**3.5**	**3.2**	**3.2**	**3.8**	**3.7**	**4.3**
WEIGHT		lbs	465	930	1,000	1,100	1,210	1,730	2,100	2,650
		kg	**211**	**422**	**454**	**499**	**549**	**785**	**953**	**1,202**
STROKE UP		in.	4.00	4.75	4.75	4.75	4.75	5.00	5.00	6.00
(FREE STROKE)		**mm**	**102**	**121**	**121**	**121**	**121**	**127**	**127**	**152**
STROKE DOWN		in.	4.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
		mm	**102**	**152**	**152**	**152**	**152**	**152**	**152**	**152**
PRESET RELEASE UP	STD.	lbf	40,000	90,000	90,000	90,000	90,000	95,000	100,000	100,000
(DOWN = 45% OF UP)		**daN**	**17,700**	**40,000**	**40,000**	**40,000**	**40,000**	**42,000**	**44,000**	**44,000**
	MAX.	lbf	55,000	140,000	140,000	140,000	140,000	150,000	155,000	155,000
		daN	**24,400**	**62,000**	**62,000**	**62,000**	**62,000**	**67,000**	**69,000**	**69,000**
MAX TENSILE		lbf	416,000	755,000	755,000	828,000	828,000	965,000	1,225,000	1,860,000
LOAD AFTER JARRING		**daN**	**185,000**	**335,000**	**335,000**	**368,000**	**368,000**	**428,000**	**544,000**	**826,000**
MAX TORSIONAL LOAD		ft.lb	16,000	41,000	41,000	40,000	40,000	68,000	102,000	102,000
(TO YIELD BODY CONNS)		**N.m**	**22,000**	**56,000**	**56,000**	**54,000**	**54,000**	**92,000**	**138,000**	**138,000**
PUMP OPEN AREA		sq. in.	6.0	9.6	9.6	11.0	11.0	14.2	15.9	15.9
		sq.cm.	**39**	**62**	**62**	**71**	**71**	**92**	**103**	**103**

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NATIONAL OILWELL (GRIFFITH)
PRESSURE COMPENSATED SHOCK TOOL

TOOL OD	in.	11.00	12.00	14.00
(+API DRILL COLLAR TOLERANCE)	**mm**	**279**	**305**	**356**
MAXIMUM RECOMMENDED HOLE DIAMETER	in.	17 1/2	17 1/2	26
(HOLE OPENERS NOT RECOMMENDED)	**mm**	**445**	**445**	**660**
TOOL ID	in.	2.81	2.81	3.00
	mm	**71**	**71**	**76**
LENGTH	ft.	14.0	12.2	15.0
	m	**4.27**	**3.72**	**4.57**
WEIGHT	lbs	3,200	3,400	5,200
	kg	**1 450**	**1 540**	**2 360**
AXIAL LOAD TO FULLY COMPRESS TOOL	lbf	100,000	100,000	140,000
	daN	**44,000**	**44,000**	**62,000**
TENSILE LOAD AT YIELD	lbf	808,000	1,337,000	1,865,000
	daN	**359,000**	**594,000**	**828,000**
MAXIMUM TORSIONAL LOAD	ft.lb	187,000	244,000	400,000
(TO YIELD BODY CONNECTIONS)	**N.m**	**253 500**	**330 800**	**542 300**
PUMP OPEN AREA	in^2	11.0	11.8	12.6
	cm^2	**71**	**76**	**81**
SPRING RATE	lbs/in	15,000	15,000	22,000
	N/mm	**2 630**	**2 630**	**3 850**
OPENING TRAVEL	in.	2.5	2.5	2.0
	mm	**64**	**64**	**51**
CLOSING TRAVEL	in.	7.0	7.0	7.0
	mm	**178**	**178**	**178**

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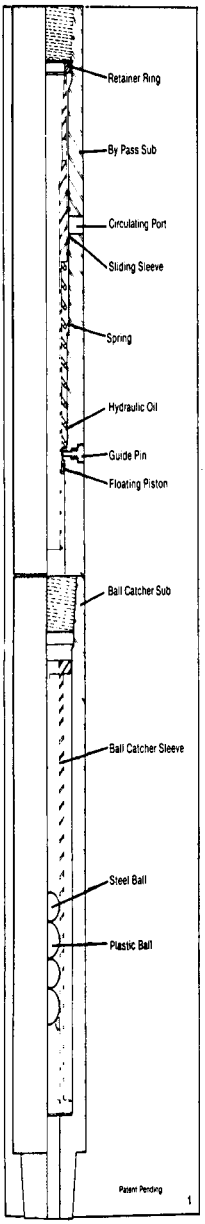


The PBL Bypass System

The PBL Bypass System has been designed to allow displacement of larger particles of loss circulation material (LCM) without affecting peak drilling efficiency.

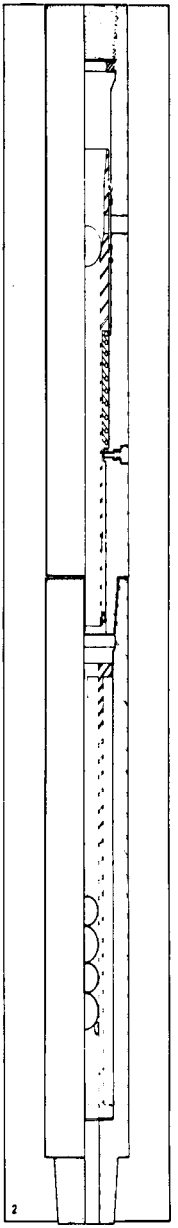
To Activate the Bypass System:

- Break the drill string and drop a ball down it. When the ball reaches the bypass sub, it will open a port. Balls may be pumped part way to the sub in order to speed up the procedure; however, pumping should be stopped two barrels before the ball reaches the sub. With ball in place apply pump pressure causing spring loaded sleeve to compress. With the port open, LCM is displaced directly into the annulus. The drill string should be rotated or reciprocated to avoid sticking. Once circulation has been regained and all the LCM has been displaced, the tool may be deactivated. It is important that all the LCM is displaced in order to prevent plugging of the bit jets.

To Deactivate the Bypass Sytem:

- Drop a steel ball. The steel ball will restrict the flow out of the port. When the pump pressure reaches the preset ball shearing pressure, the plastic ball will blow through the sleeve, the spring will reset the sleeve and the steel ball will fall through into the ball catcher sleeve. This procedure can be repeated four times without effecting flow.

NOTE: balls may be removed from the ball catcher sub by breaking the top connection on the sub and removing the sleeve.



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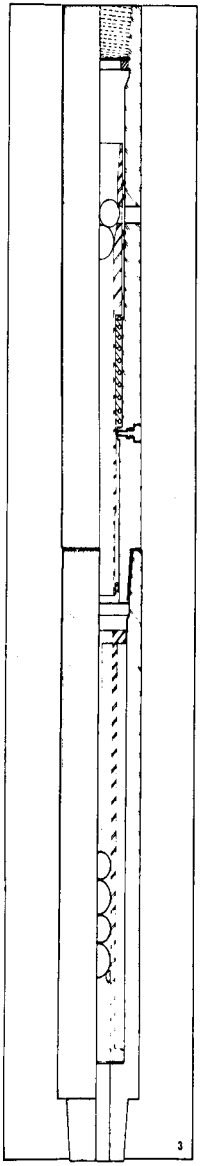


The PBL By-Pass System is totally balanced and Hydrostatic pressure doesn't effect it.

The Ball Shearing pressure can be set to operator's preference.

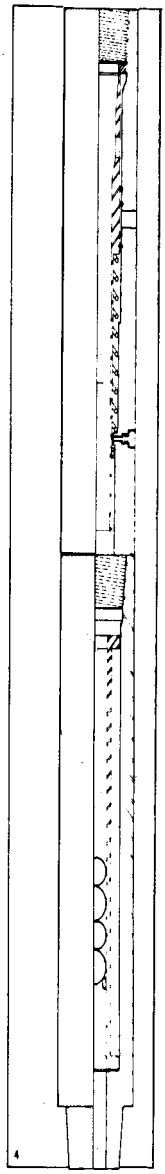
There are numerous applications for the By-Pass Sub:

- Conventional Drilling
- Drilling with a down hole motor
- Coring
- Above any down hole equipment with restrictions (ex: MWD)
- Increasing flow rates to aid in hole cleaning during work overs and drilling.

The By-Pass Sub is useful in controlling extreme loss of circulation by treating the thief zone quickly with as highly concentrated LCM as your surface equipment can handle. When returns are satisfactory you may close the tool and continue drilling. If another zone is encountered, just repeat the operation.

The By-Pass Sub may also be tested at any time on surface or in the hole.

1) DRILLING POSITION
2) OPEN POSITION
3) PRESSURING UP
4) DRILLING POSITION



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SECTION 2
CASING

	Page
API Casing Requirements and Range Lengths	1 - 2
Casing Dimensional Data	3 - 33
Casing Performance Properties	34 - 65
Pressure Leak Resistance	66
Make-Up Torque, Short Thread	67 - 69
Make-Up Torque, Long Thread	70 - 73
Make-Up Torque, Special Threads	74 - 86
Drift Information For Casing	87 - 89
Drift Information For Bare & Coated Casing	90
Aluminum & Plain End Liners	91-92
1997 Casing ReferenceTables	93-137

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API CASING REQUIREMENTS

Casing and Liners Drift Mandrel Dimensions		
Product and Size in. (mm)	Minimum Drift Mandrel	
	Length in. (mm)	Diameter in. (mm)
Smaller than 9 5/8 (244.48)	6 (152.4)	ID -1/8 (3.17)
9 5/8 to 13 3/8, incl. (244.48 to 339.72)	12 (304.8)	ID -5/32 (3.97)
Larger than 13 3/8 (339.72)	12 (304.8)	ID -3/16 (4.76)
* The minimum diameter of the drift mandrel for extreme-line casing shall be shown in Table 22, colums 12 and 13 of the API Specifications 5CT Fifth Edition, April 1, 1995.		

Tolerances on Dimensions and Weight				
Outside Diameter	**(D)**	**Tolerance**	**Range**	
			Minimum	**Maximum**
	4" & Smaller 4 1/2" & Larger	±0.031" +1%D, -0.5% D	D - 0.031" D - D x 0.005	D + 0.031" D + D x 0.01
Wall Thickness	The tolerance on wall thickness is 12.5%. Minimum wall thickness= t - 0.125 x t			
Inside Diameter	The inside diameter is governed by the outside diameter and weight tolerance			
Weight	Tolerances for single lengths are +6.5% ,-3.5%. The tolerance for carload lots is -1.75%. A carload is considered to be a minimum of 40,000pounds (18,144kg).			

Drift Mandrel Dimensions for Casing Used in Tubing Services		
Size/Designation	Minimum Drift Mandrel	
in (mm)	Length in. (m)	Diameter in. (mm)
4 1/2 (114.3) exclusive to 8 5/8 (219.08) inclusive	42 (1.07)	-1/8 (3.18)
8 5/8 (219.08) exclusive to 10 3/4 (273.05) exclusive	42 (1.07)	-5/32 (3.97)

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Casing and Liner Range Lengths			
	Range 1 ft. (m)	Range 2 ft. (m)	Range 3 ft. (m)
Range Length, Minimum	16.0 (4.88)	25.0 (7.62)	34.0 (10.36)
Range Length, Maximum	25.0 (7.62)	34.0 (10.36)	48.0 (14.63)
Range Length for 95% or more of carload: Permissible variations within the range length, maximum	6.0 (1.83)	5.0 (1.52)	6.0 (1.83)
Permissible length, minimum	18.0 (5.49)	28.0 (8.53)	36.0 (10.97)

Drift Mandrel Dimensions for Casing Used With Common Bit Sizes			
Desingation		Minimum Drift Mandrel	
Size In. (mm)	Weigth LB (kg/m)	Length IN. (mm)	Diameter In. (mm)
7 (177.80)	23.0 (34.22)	6 (152.4)	6.250 (158.75)
7 (177.80)	32.0 (47.61)	6 (152.4)	6.000 (152.40)
7 3/4 (196.85)	46.1 (68.59)	6 (152.4)	6.500 (165.10)
8 5/8 (219.08)	32.0 (47.61)	6 (152.4)	7.875 (200.03)
8 5/8 (219.08)	40.0 (59.51)	6 (152.4)	7.625 (193.67)
9 5/8 (244.48)	40.0 (59.51)	12 (304.8)	8.750 (222.25)
9 5/8 (244.48)	53.5 (79.60)	12 (304.8)	8.500 (215.90)
9 5/8 (244.48)	58.4 (86.88)	12 (304.8)	8.375 (212.73)
10 3/4 (273.05)	45.5 (67.70)	12 (304.8)	9.875 (250.83)
10 3/4 (273.05)	55.5 (82.57)	12 (304.8)	9.625 (269.88)
11 3/4 (298.45)	42.0 (62.49)	12 (304.8)	11.000 (279.40)
11 3/4 (298.45)	60.0 (89.27)	12 (304.8)	10.625 (269.88)
11 3/4 (298.45)	65.0 (96.70)	12 (304.8)	10.625 (269.88)
13 3/8 (339.72)	72.0 (107.12)	12 (304.8)	12.250 (311.15)

Formula
Weight of pipe in air, plain end (O.D^2 - I.D ^{2} x2.67=_____lb/ft)
To find barrels per ft. in tubular goods (I.D^2 x 0.7854 x 12÷ 231 ÷42)=BBL/FT

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CASING DIMENSIONAL DATA

Casing O.D.	Weight T & C		Weight Plain End		Casing Nom I.D.		Wall Thickness		Drift I.D.		API Cplg O.D.	API Cplg Lengths Round Short	API Cplg Lengths Round Long	API Cplg Lengths Butt-ress
in **mm**	lb/ft	**kg/m**	lb/ft	**kg/m**	in	**mm**	in	**mm**	in	**mm**	in **mm**	in **mm**	in **mm**	in **mm**
4 **101.6**	9.26	**13.78**	9.07	**13.50**	3.550	**90.17**	0.225	**5.72**	3.425	**86.99**				
	9.50	**14.13**	9.11	**13.56**	3.548	**90.12**	0.226	**5.74**	3.423	**86.94**				
	10.90	**16.22**	10.46	**15.57**	3.476	**88.29**	0.262	**6.65**	3.351	**85.12**				
	11.00	**16.37**	10.39	**15.46**	3.480	**88.39**	0.260	**6.61**	3.355	**85.22**				
	11.60	**17.26**	11.34	**16.88**	3.428	**87.07**	0.286	**7.27**	3.303	**83.90**				
	12.60	**18.75**	12.51	**18.61**	3.364	**85.45**	0.318	**8.08**	3.239	**82.27**				
	13.00	**19.34**	12.93	**19.25**	3.340	**84.84**	0.330	**8.38**	3.215	**81.66**				
	14.80	**22.02**	14.69	**21.86**	3.240	**82.30**	0.380	**9.65**	3.115	**79.12**				
	16.50	**24.55**	16.40	**24.40**	3.140	**79.76**	0.430	**10.92**	3.015	**76.58**				
4 1/2 **114.3**	6.75	**10.04**	6.61	**9.84**	4.216	**107.09**	0.142	**3.61**	4.091	**103.91**				
	8.77	**13.05**	8.66	**12.88**	4.124	**104.75**	0.188	**4.78**	3.999	**101.57**				
	9.50	**14.13**	9.40	**13.99**	4.090	**103.99**	0.205	**5.16**	3.965	**100.71**	5.000 **127.0**	6.250 **158.8**		
	10.50	**15.62**	10.25	**15.26**	4.051	**102.87**	0.225	**5.72**	3.926	**99.72**				
	11.60	**17.26**	11.35	**16.89**	4.000	**101.60**	0.250	**6.35**	3.875	**98.42**			7.000 **177.8**	8.875 **225.4**
	11.77	**17.48**	11.77	**17.52**	3.980	**101.09**	0.260	**6.61**	3.855	**97.92**				
	12.60	**18.75**	12.24	**18.22**	3.958	**100.53**	0.271	**6.89**	3.833	**97.36**				
	13.50	**20.09**	13.04	**19.40**	3.920	**99.57**	0.290	**7.37**	3.795	**96.39**				
	15.10	**22.62**	14.98	**22.30**	3.826	**97.18**	0.337	**8.56**	3.701	**94.00**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight T & C		Weight Plain End		Casing Nom I.D.		Wall Thickness		Drift I.D.		API Cplg O.D.	API Cplg Lengths Round Short	API Cplg Lengths Round Long	API Cplg Lengths Butt-ress
in **mm**	lb/ft	**kg/m**	lb/ft	**kg/m**	in	**mm**	in	**mm**	in	**mm**	in **mm**	in **mm**	in **mm**	in **mm**
4 1/2 **114.3**	16.60	**24.70**	16.44	**24.47**	3.754	**95.35**	0.373	**9.48**	3.629	**92.18**				
	17.00	**25.30**	16.72	**24.88**	3.740	**95.00**	0.380	**9.65**	3.615	**91.82**				
	18.90	**28.12**	18.69	**27.82**	3.640	**92.46**	0.430	**10.92**	3.515	**89.28**				
	19.10	**28.42**	18.96	**28.22**	3.626	**92.10**	0.437	**11.10**	3.501	**88.93**				
	21.50	**31.99**	21.36	**31.79**	3.500	**88.90**	0.500	**12.70**	3.375	**85.72**				
	23.70	**35.27**	23.56	**35.07**	3.380	**85.85**	0.560	**14.23**	3.255	**82.68**				
	26.10	**38.84**	26.04	**38.75**	3.240	**82.30**	0.630	**16.00**	3.115	**79.12**				
4 3/4 **120.7**	16.00	**23.80**	15.75	**23.44**	4.082	**103.68**	0.334	**8.49**	3.957	**100.50**				
	16.50	**24.55**	16.01	**23.83**	4.070	**103.38**	0.340	**8.64**	3.945	**100.20**				
	18.00	**26.78**	17.52	**26.08**	4.000	**101.60**	0.375	**9.53**	3.875	**98.42**				
	20.00	**29.76**	19.42	**28.90**	3.910	**99.31**	0.420	**10.67**	3.785	**96.14**				
	21.00	**31.24**	20.67	**30.75**	3.850	**97.79**	0.450	**11.43**	3.725	**94.61**				
5 **127.0**	8.00	**11.90**	7.87	**11.71**	4.696	**119.28**	0.152	**3.86**	4.571	**116.10**				
	11.50	**17.11**	11.23	**16.71**	4.560	**115.82**	0.220	**5.59**	4.435	**112.65**				
	12.85	**19.12**	12.68	**18.87**	4.500	**114.30**	0.250	**6.35**	4.375	**111.12**				
	13.00	**19.34**	12.83	**19.09**	4.494	**114.15**	0.253	**6.43**	4.396	**110.97**	5.56 **141.3**	6.50 **165.1**	7.75 **196.9**	9.13 **231.8**
	14.00	**20.83**	13.88	**20.65**	4.450	**113.03**	0.275	**6.99**	4.325	**109.25**				
	15.00	**22.32**	14.87	**22.13**	4.408	**111.96**	0.296	**7.52**	4.283	**108.79**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
5 127.0	17.70	26.33	17.38	25.87	4.300	109.22	0.350	8.89	4.175	106.04	5.56 141.3		7.75 196.9	9.13 231.8
	18.00	26.78	17.93	26.69	4.276	108.61	0.362	9.19	4.151	105.44				
	20.30	30.20	20.01	29.78	4.184	106.30	0.408	10.36	4.059	103.10				
	20.80	30.95	20.63	30.71	4.156	105.60	0.422	10.72	4.031	102.40				
	21.00	31.24	20.68	30.77	4.154	105.51	0.423	10.74	4.029	102.34				
	21.40	31.84	21.30	31.69	4.126	104.80	0.437	11.10	4.001	101.63				
	23.20	34.53	23.09	34.35	4.044	102.71	0.478	12.14	3.919	99.54				
	24.10	35.86	24.03	35.76	4.000	101.60	0.500	12.70	3.875	98.42				
	26.70	39.73	26.64	39.64	3.876	98.45	0.562	14.27	3.751	95.28				
	29.20	43.45	29.20	43.46	3.750	95.25	0.625	15.88	3.625	92.07				
	31.60	47.02	31.65	47.09	3.626	92.10	0.687	17.45	3.501	88.93				
	34.00	50.59	34.04	50.66	3.500	88.90	0.750	19.05	3.375	85.73				
5 1/4 133.4	8.50	12.65	8.33	12.39	4.944	125.58	0.153	3.89	4.819	122.40				
	10.00	14.88	9.85	14.66	4.886	124.10	0.182	4.63	4.761	120.93				
	13.00	19.34	12.89	19.19	4.768	121.11	0.241	6.12	4.643	117.93				
	16.00	23.81	15.86	23.60	4.650	118.11	0.300	7.62	4.525	114.93				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
5 1/2 **139.7**	9.00	**13.39**	8.79	**13.09**	5.192	**131.88**	0.154	**3.91**	5.067	**128.73**				
	13.00	**19.34**	12.84	**19.10**	5.044	**128.12**	0.228	**5.79**	4.919	**124.94**				
	14.00	**20.83**	13.70	**20.38**	5.012	**127.30**	0.244	**6.20**	4.887	**124.13**	6.05 **153.7**	6.75 **171.5**		
	15.00	**22.32**	14.71	**21.89**	4.974	**126.34**	0.263	**6.68**	4.849	**123.16**				
	15.50	**23.06**	15.35	**22.84**	4.950	**125.73**	0.275	**6.98**	4.825	**122.55**			8.00 **203.2**	9.25 **234.9**
	17.00	**25.29**	16.87	**25.11**	4.892	**124.26**	0.304	**7.72**	4.767	**121.08**				
	20.00	**29.76**	19.81	**29.49**	4.778	**121.36**	0.361	**9.17**	4.653	**118.19**				
	23.00	**34.22**	22.54	**33.54**	4.670	**118.62**	0.415	**10.54**	4.545	**115.44**				
	23.80	**35.41**	23.63	**35.17**	4.626	**117.50**	0.437	**11.10**	4.501	**114.33**				
	25.00	**37.19**	24.76	**36.85**	4.580	**116.33**	0.460	**11.69**	4.455	**113.16**				
	26.00	**38.68**	25.54	**38.01**	4.548	**115.52**	0.476	**12.09**	4.423	**112.34**				
	26.80	**39.88**	26.70	**39.73**	4.500	**114.30**	0.500	**12.70**	4.375	**111.13**				
	28.40	**42.26**	28.13	**41.87**	4.440	**112.78**	0.530	**13.46**	4.315	**109.60**				
	29.70	**44.19**	29.64	**44.11**	4.376	**111.15**	0.562	**14.28**	4.251	**107.98**				
	32.30	**48.06**	31.95	**47.55**	4.276	**108.61**	0.612	**15.55**	4.151	**105.44**				
	32.60	**48.51**	32.54	**48.43**	4.250	**107.95**	0.625	**15.88**	4.125	**104.78**				
	35.30	**52.53**	35.31	**52.55**	4.126	**104.80**	0.687	**17.45**	4.001	**101.63**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
5 1/2 139.7	36.40	54.16	36.10	53.73	4.090	103.89	0.705	17.91	3.965	100.70				
	38.00	56.54	38.05	56.62	4.000	101.60	0.750	19.05	3.875	98.42				
	40.50	60.26	40.66	60.50	3.876	98.45	0.812	20.63	3.751	95.28				
	43.10	64.13	43.22	64.32	3.750	95.25	0.875	22.23	3.625	92.07				
5 9/16 141.3	15.00	22.32	14.60	21.73	5.047	128.19	0.258	6.55	4.922	125.02				
	21.00*	31.25	20.76	30.90	4.813	122.25	0.375	9.52	4.688	119.08				
5 3/4 146.1	14.00	20.83	13.56	20.18	5.290	134.37	0.230	5.84	5.165	131.19				
	17.00	25.30	16.36	24.34	5.190	131.83	0.280	7.11	5.065	128.65				
	19.50	29.01	19.10	28.43	5.090	129.29	0.330	8.38	4.965	126.11				
	22.50	33.48	21.79	32.43	4.990	126.75	0.380	9.65	4.865	123.57				
	23.00	34.22	21.63	32.19	4.996	126.90	0.377	9.58	4.871	123.72				
	25.20	37.49	24.43	36.36	4.890	124.21	0.430	10.92	4.765	121.03				
6 152.4	10.50	15.62	10.22	15.21	5.672	144.07	0.164	4.17	5.547	140.89				
	12.00	17.85	11.79	17.55	5.620	142.74	0.190	4.83	5.495	139.57				
	14.00	20.83	13.82	20.56	5.552	141.02	0.224	5.69	5.427	138.99				
	15.00	22.32	14.65	21.80	5.524	140.31	0.238	6.05	5.399	137.13				
	16.00	23.80	15.35	22.85	5.500	139.70	0.250	6.35	5.375	136.52				
	17.00	25.29	16.81	25.02	5.450	138.43	0.275	6.99	5.325	135.25				

* Plain End

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in **mm**	lb/ft	**kg/m**	lb/ft	**kg/m**	in	**mm**	in	**mm**	in	**mm**	in **mm**	in **mm**	in **mm**	in **mm**
6 **152.4**	18.00	**26.78**	17.57	**26.15**	5.424	**137.77**	0.288	**7.32**	5.299	**134.59**				
	20.00	**29.76**	19.64	**29.23**	5.352	**135.94**	0.324	**8.23**	5.227	**132.77**				
	23.00	**34.22**	22.81	**33.94**	5.240	**133.10**	0.380	**9.65**	5.115	**129.92**				
	26.00	**38.68**	25.80	**38.39**	5.132	**130.40**	0.434	**11.00**	5.007	**127.20**				
6 5/8 **168.3**	12.00	**17.85**	11.65	**17.34**	6.287	**159.69**	0.169	**4.29**	6.162	**156.51**				
	13.00	**19.34**	12.72	**18.94**	6.255	**158.88**	0.185	**4.70**	6.130	**155.70**				
	17.00	**25.30**	16.69	**24.84**	6.135	**155.83**	0.245	**6.22**	6.010	**152.65**				
	19.45	**28.94**	18.97	**28.24**	6.065	**154.05**	0.280	**7.11**	5.940	**150.88**				
	20.00	**29.76**	19.49	**29.01**	6.049	**153.64**	0.288	**7.32**	5.924	**150.47**	7.39 **187.7**	7.25 **184.2**	8.75 **222.3**	9.63 **244.5**
	22.00	**32.73**	21.42	**31.88**	5.989	**152.12**	0.318	**8.08**	5.864	**148.95**				
	23.20	**34.52**	22.19	**33.02**	5.965	**151.51**	0.330	**8.38**	5.845	**148.46**				
	24.00	**35.71**	23.58	**35.10**	5.921	**150.39**	0.352	**8.94**	5.796	**147.22**				
	25.00	**37.19**	24.87	**37.02**	5.880	**149.30**	0.373	**9.49**	5.755	**146.18**				
	26.00	**38.68**	25.66	**38.18**	5.855	**148.72**	0.385	**9.78**	5.730	**145.54**				
	26.60	**39.87**	26.22	**39.02**	5.837	**148.26**	0.394	**10.01**	5.712	**145.08**				
	28.00	**41.66**	27.65	**41.14**	5.791	**147.09**	0.417	**10.59**	5.666	**143.92**				
	29.00	**43.15**	28.57	**42.52**	5.761	**146.33**	0.432	**10.97**	5.636	**143.15**				
	32.00	**47.62**	31.20	**46.43**	5.675	**144.14**	0.475	**12.07**	5.550	**140.97**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
6 5/8 **168.3**	33.00	**49.10**	32.71	**48.67**	5.625	**142.90**	0.500	**12.69**	5.500	**139.70**				
	34.00	**50.59**	33.61	**50.01**	5.595	**142.11**	0.515	**13.08**	5.470	**138.94**				
	34.50	**51.34**	34.20	**50.90**	5.575	**141.60**	0.525	**13.34**	5.450	**138.43**				
	36.70	**54.61**	36.39	**54.16**	5.501	**139.73**	0.562	**81.38**	5.376	**136.55**				
6 5/8 **168.3**	40.20	**59.82**	40.05	**59.60**	5.375	**136.52**	0.625	**15.88**	5.250	**133.35**				
	43.70	**65.03**	43.57	**64.84**	5.251	**133.38**	0.687	**17.45**	5.126	**130.20**				
	47.10	**70.08**	47.06	**70.03**	5.125	**130.17**	0.750	**19.05**	5.000	**127.00**				
	50.40	**75.00**	50.41	**75.02**	5.001	**127.03**	0.812	**20.62**	4.876	**123.85**				
	53.70	**79.91**	53.73	**79.97**	4.875	**123.82**	0.875	**22.23**	4.750	**120.65**				
	56.80	**84.52**	56.92	**84.71**	4.751	**120.68**	0.937	**23.80**	4.626	**117.50**				
	59.90	**89.13**	60.08	**89.40**	4.625	**117.47**	1.000	**25.40**	4.500	**114.30**				
	62.90	**93.60**	63.10	**93.90**	4.501	**114.33**	1.062	**26.97**	4.376	**111.15**				
	65.80	**97.91**	66.08	**98.34**	4.375	**111.12**	1.125	**28.58**	4.250	**107.95**				
	71.30	**106.09**	71.76	**106.79**	4.125	**104.77**	1.250	**31.75**	4.000	**101.60**				
7 **177.8**	13.00	**19.34**	12.69	**18.88**	6.652	**168.96**	0.174	**4.42**	6.527	**165.79**				
	17.00	**25.29**	16.70	**24.85**	6.538	**166.07**	0.231	**5.87**	6.413	**162.89**	7.66 **194.5**	7.25 **184.2**		
	20.00	**29.76**	19.54	**29.09**	6.456	**163.98**	0.272	**6.91**	6.331	**160.81**				
	22.00	**32.73**	21.54	**32.05**	6.398	**162.51**	0.301	**7.65**	6.273	**159.33**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
7 177.8	23.00	35.22	22.63	33.67	6.366	161.70	0.317	8.05	6.241	158.52	7.66 194.5	7.25 184.2	9.00 228.6	10.00 254.0
	24.00	35.71	23.64	35.19	6.336	160.93	0.332	8.44	6.211	157.76				
	26.00	38.68	25.66	38.19	6.276	159.41	0.362	9.20	6.151	156.24				
	28.00	41.66	27.73	41.27	6.214	157.84	0.393	9.98	6.089	154.66				
	29.00	43.15	28.72	42.75	6.184	157.07	0.408	10.37	6.059	153.90				
	29.80	44.34	29.25	43.53	6.168	156.67	0.416	10.57	6.043	153.49				
	30.00	44.63	29.71	44.22	6.154	156.31	0.423	10.75	6.029	153.14				
	32.00	47.61	31.68	47.14	6.094	154.79	0.453	11.51	5.969	151.61				
	33.70	50.14	33.17	49.36	6.048	153.62	0.476	12.09	5.923	150.44				
	34.00	50.59	33.42	49.74	6.040	153.42	0.480	12.19	5.915	150.24				
	35.00	52.07	34.58	51.46	6.004	152.50	0.498	12.65	5.879	149.33				
	35.30	52.52	34.71	51.65	6.000	152.40	0.500	12.70	5.875	149.22				
	38.00	56.54	37.26	55.44	5.920	150.37	0.540	13.72	5.795	147.19				
	40.00	59.51	39.89	59.37	5.836	148.23	0.582	14.79	5.711	145.06				
	41.00	61.00	40.39	60.11	5.820	147.83	0.590	14.99	5.695	144.65				
	42.70	63.53	42.55	63.33	5.750	146.05	0.625	15.88	5.625	142.87				
	43.00	63.98	42.98	63.97	5.736	145.69	0.632	16.06	5.611	142.52				
	44.00	65.46	43.47	64.69	5.720	145.29	0.640	16.26	5.595	142.11				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
7 **177.8**	45.40	**67.11**	45.30	**67.41**	5.660	**143.76**	0.670	**17.02**	5.535	**140.59**				
	46.40	**69.04**	46.32	**68.93**	5.626	**142.90**	0.687	**17.45**	5.501	**139.73**				
	49.50	**73.65**	48.88	**72.75**	5.540	**140.72**	0.730	**18.54**	5.415	**137.54**				
	50.10	**74.55**	50.06	**74.50**	5.500	**139.70**	0.750	**19.05**	5.375	**136.52**				
	53.60	**79.76**	53.66	**79.86**	5.376	**136.55**	0.812	**20.63**	5.251	**133.38**				
	57.10	**84.96**	57.24	**85.18**	5.250	**133.35**	0.875	**22.23**	5.125	**130.17**				
	60.50	**90.02**	60.67	**90.29**	5.126	**130.20**	0.937	**23.80**	5.001	**127.03**				
	63.90	**93.89**	64.08	**95.36**	5.000	**127.00**	1.000	**25.40**	4.875	**123.82**				
	67.10	**99.84**	67.35	**100.23**	4.876	**123.85**	1.062	**26.97**	4.751	**120.68**				
	70.30	**104.61**	70.59	**105.05**	4.750	**120.65**	1.125	**28.57**	4.625	**117.47**				
	76.30	**113.53**	76.76	**114.24**	4.500	**114.30**	1.250	**31.75**	4.375	**111.12**				
7 5/8 **(193.67)**	14.75	**21.95**	14.39	**21.41**	7.263	**184.48**	0.181	**4.60**	7.138	**181.31**				
	20.00	**29.76**	19.69	**29.30**	7.125	**180.97**	0.250	**6.35**	7.000	**177.80**				
	24.00	**35.71**	23.47	**34.93**	7.025	**178.43**	0.300	**7.62**	6.900	**175.26**	8.50 **215.9**	7.50 **190.5**		
	26.40	**39.28**	25.56	**38.04**	6.969	**177.01**	0.328	**8.33**	6.844	**173.84**				
	29.70	**44.19**	29.04	**43.21**	6.875	**174.62**	0.375	**9.52**	6.750	**171.45**			9.25 **234.9**	10.38 **263.5**
	33.70	**50.14**	33.04	**49.17**	6.765	**171.83**	0.430	**10.92**	6.640	**168.66**				
	34.00	**50.59**	33.22	**49.44**	6.760	**171.70**	0.433	**10.99**	6.635	**168.53**				
	35.50	**52.82**	35.02	**52.12**	6.710	**170.43**	0.458	**11.62**	6.585	**167.26**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
	36.00	**53.56**	35.20	**52.38**	6.705	**170.31**	0.460	**11.68**	6.580	**167.13**				
	38.00	**56.54**	36.98	**55.04**	6.655	**169.04**	0.485	**12.32**	6.530	**165.86**				
	39.00	**58.03**	38.05	**56.62**	6.625	**168.27**	0.500	**12.70**	6.500	**165.10**	8.50		9.25	10.38
	42.50	**63.68**	42.39	**63.09**	6.501	**165.13**	0.562	**14.27**	6.376	**161.95**	**215.9**		**234.9**	**263.5**
	45.30	**67.40**	44.67	**66.48**	6.435	**163.45**	0.595	**15.11**	6.310	**160.27**				
	47.10*	**70.08**	46.73	**69.54**	6.375	**161.92**	0.625	**15.88**	6.250	**158.75**				
7 5/8 **193.7**	51.20	**76.18**	50.91	**75.76**	6.251	**158.77**	0.687	**17.45**	6.126	**155.60**				
	52.80	**78.57**	52.57	**78.23**	6.201	**157.51**	0.712	**18.08**	6.076	**154.33**				
	55.30	**82.29**	55.07	**81.95**	6.125	**155.57**	0.750	**19.05**	6.000	**152.40**				
	59.20	**88.09**	59.08	**87.93**	6.001	**152.43**	0.812	**20.62**	5.876	**149.25**				
	63.20	**94.04**	63.08	**93.87**	5.875	**149.22**	0.875	**22.22**	5.750	**146.05**				
	66.90	**95.55**	66.93	**99.60**	5.751	**146.08**	0.937	**23.80**	5.626	**142.90**				
	70.10	**104.31**	70.76	**105.30**	5.625	**142.87**	1.000	**25.40**	5.500	**139.70**				
	74.30	**110.56**	74.44	**110.78**	5.501	**139.73**	1.062	**26.97**	5.376	**136.55**				
	77.90	**115.92**	78.10	**116.22**	5.375	**136.52**	1.125	**28.57**	5.250	**133.35**				
7 3/4 **196.9**	46.10	**68.59**	45.47	**67.66**	6.560	**166.62**	0.595	**15.12**	6.435	**163.45**				

* Plain End

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in **mm**	lb/ft	**kg/m**	lb/ft	**kg/m**	in	**mm**	in	**mm**	in	**mm**	in **mm**	in **mm**	in **mm**	in **mm**
8 **203.2**	16.00	**23.81**	15.52	**23.10**	7.628	**193.75**	0.186	**4.72**	7.503	**190.58**				
	20.00	**29.76**	19.57	**29.12**	7.528	**191.21**	0.236	**5.99**	7.403	**188.04**				
	23.09*	**34.35**	23.09	**34.36**	7.440	**188.98**	0.280	**7.11**	7.315	**185.80**				
	26.00	**38.68**	25.22	**37.54**	7.386	**187.60**	0.307	**7.80**	7.261	**184.43**				
8 1/8 **206.4**	28.00	**41.66**	26.67	**39.70**	7.485	**190.12**	0.320	**8.13**	7.360	**186.94**				
	32.00	**47.61**	30.65	**45.60**	7.385	**187.58**	0.370	**9.90**	7.260	**184.40**				
	36.00	**53.56**	34.56	**51.43**	7.285	**185.04**	0.420	**11.67**	7.160	**181.86**				
	40.00	**59.51**	38.43	**57.18**	7.185	**182.50**	0.470	**13.44**	7.060	**179.32**				
	42.00	**62.49**	40.72	**60.60**	7.125	**180.97**	0.500	**14.70**	7.000	**177.80**				
8 5/8 **219.1**	17.50	**26.04**	16.94	**25.21**	8.249	**209.52**	0.188	**4.78**	8.124	**206.35**				
	20.00	**29.76**	19.49	**29.00**	8.191	**208.05**	0.217	**5.52**	8.066	**204.88**				
	24.00	**35.71**	23.57	**35.08**	8.097	**205.66**	0.264	**6.71**	7.972	**202.49**				
	25.55	**38.01**	24.70	**36.75**	8.071	**205.00**	0.277	**7.04**	7.946	**201.83**				
	24.96*	**37.14**	24.96	**37.14**	8.065	**204.85**	0.280	**7.12**	7.940	**201.68**				
	28.00	**41.66**	27.02	**40.20**	8.017	**203.63**	0.304	**7.73**	7.892	**200.46**				
	29.35	**43.67**	28.55	**42.49**	7.981	**202.72**	0.322	**8.18**	7.856	**199.54**	9.63 **244.5**	7.75 **196.9**		
	32.00	**47.61**	31.10	**46.28**	7.921	**201.19**	0.352	**8.95**	7.796	**198.02**				
	32.40	**48.20**	31.27	**46.54**	7.917	**201.09**	0.354	**9.00**	7.792	**197.92**			10.00 **254.0**	10.63 **269.9**

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in **mm**	lb/ft	**kg/m**	lb/ft	**kg/m**	in	**mm**	in	**mm**	in	**mm**	in **mm**	in **mm**	in **mm**	in **mm**
	36.00	**53.56**	35.14	**52.29**	7.825	**198.75**	0.400	**10.17**	7.700	**195.58**		7.75 **196.9**		
	38.00	**56.54**	37.22	**55.39**	7.775	**197.48**	0.425	**10.80**	7.650	**194.31**				
	40.00	**59.51**	39.29	**58.47**	7.725	**196.21**	0.450	**11.44**	7.600	**193.04**				
	43.00	**63.98**	42.33	**62.99**	7.651	**194.34**	0.487	**12.37**	7.526	**191.16**	9.63 **244.5**		10.00 **254.0**	10.63 **269.9**
	44.00	**65.47**	43.39	**64.57**	7.625	**193.67**	0.500	**12.71**	7.500	**190.50**				
	48.00	**71.41**	46.95	**69.87**	7.537	**191.44**	0.544	**13.82**	7.412	**188.26**				
8 5/8 **219.1**	49.00	**72.91**	48.00	**71.42**	7.511	**190.78**	0.557	**14.15**	7.386	**187.60**				
	49.10	**73.07**	48.40	**72.02**	7.501	**190.53**	0.562	**14.27**	7.376	**187.35**				
	52.00	**77.37**	51.03	**75.94**	7.435	**188.85**	0.595	**15.12**	7.310	**185.67**				
	54.00	**80.35**	53.40	**79.47**	7.375	**187.32**	0.625	**15.88**	7.250	**184.15**				
	58.70	**87.35**	58.24	**86.68**	7.251	**184.18**	0.687	**17.45**	7.126	**181.00**				
	63.50	**94.49**	63.08	**93.87**	7.125	**180.97**	0.750	**19.05**	7.000	**177.80**				
	68.10	**101.33**	67.76	**100.83**	7.001	**177.82**	0.812	**20.62**	6.876	**174.65**				
	72.70	**108.18**	72.42	**107.78**	6.875	**174.62**	0.875	**22.22**	6.750	**171.45**				
	77.10	**114.73**	76.94	**114.49**	6.751	**171.48**	0.937	**23.80**	6.626	**168.30**				
8 3/4 **222.3**	49.70	**73.94**	48.74	**72.53**	7.636	**193.95**	0.557	**14.15**	7.511	**190.78**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
9 **228.6**	19.00	**28.27**	18.43	**27.43**	8.608	**218.64**	0.196	**4.98**	8.483	**215.47**				
	34.00	**50.59**	32.78	**48.78**	8.290	**210.57**	0.355	**9.02**	8.165	**207.39**				
	38.00	**56.54**	36.91	**54.94**	8.196	**208.18**	0.402	**10.21**	8.071	**205.00**				
	40.00	**59.51**	38.92	**57.92**	8.150	**207.01**	0.425	**10.80**	8.025	**203.83**				
	45.00	**66.96**	44.02	**65.51**	8.032	**204.01**	0.484	**12.30**	7.907	**200.84**				
	50.20	**74.69**	49.21	**73.24**	7.910	**200.91**	0.545	**13.85**	7.785	**197.74**				
	54.00	**80.34**	53.41	**79.48**	7.810	**198.37**	0.595	**15.12**	7.625	**195.20**				
	55.00	**81.84**	53.33	**79.36**	7.812	**198.42**	0.594	**15.09**	7.687	**195.25**				
9 5/8 **244.5**	29.30	**43.59**	28.04	**41.73**	9.063	**230.20**	0.281	**7.14**	8.907	**226.24**				
	32.30	**48.06**	31.03	**46.18**	9.001	**228.63**	0.312	**7.93**	8.845	**224.66**				
	36.00	**53.57**	34.86	**51.88**	8.921	**226.59**	0.352	**8.94**	8.765	**222.63**		7.75 **196.9**		
	38.00	**56.54**	36.57	**54.43**	8.885	**225.68**	0.370	**9.40**	8.729	**221.72**				
	40.00	**59.51**	38.94	**57.95**	8.835	**224.41**	0.395	**10.04**	8.679	**220.45**				
	42.00	**62.49**	40.63	**60.47**	8.799	**223.49**	0.413	**10.50**	8.643	**219.53**				
	43.50	**64.73**	42.70	**63.54**	8.755	**222.38**	0.435	**11.05**	8.599	**218.41**				
	47.00	**69.93**	46.14	**68.66**	8.681	**220.50**	0.472	**11.99**	8.525	**216.53**	10.63 **269.9**			
	53.50	**79.60**	52.85	**78.65**	8.535	**216.79**	0.545	**13.85**	8.379	**212.83**			10.50 **266.7**	10.63 **269.9**
	57.40	**85.40**	56.71	**84.39**	8.450	**214.63**	0.588	**14.93**	8.294	**210.37**				
	58.40	**86.88**	57.38	**85.40**	8.435	**214.25**	0.595	**15.12**	8.279	**210.21**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in **mm**	lb/ft	**kg/m**	lb/ft	**kg/m**	in	**mm**	in	**mm**	in	**mm**	in **mm**	in **mm**	in **mm**	in **mm**
9 5/8 **244.5**	59.40	**88.37**	58.64	**87.27**	8.407	**213.54**	0.609	**15.47**	8.251	**209.58**				
	61.10	**90.90**	60.08	**89.40**	8.375	**212.72**	0.625	**15.88**	8.219	**208.76**				
	64.90	**96.56**	64.26	**95.62**	8.281	**210.34**	0.672	**17.07**	8.125	**206.37**				
	70.30	**104.60**	69.70	**103.72**	8.157	**207.19**	0.734	**18.65**	8.001	**203.23**				
	71.80	**106.82**	71.09	**105.79**	8.125	**206.37**	0.750	**19.06**	7.969	**202.41**				
	75.60	**112.49**	75.14	**111.83**	8.031	**203.99**	0.797	**20.25**	7.875	**200.03**				
	80.80	**120.33**	80.42	**119.68**	7.907	**200.69**	0.859	**21.82**	7.751	**196.88**				
	86.00	**127.97**	85.70	**127.53**	7.781	**197.64**	0.922	**23.42**	7.625	**193.67**				
	91.00	**135.41**	90.81	**135.14**	7.657	**194.49**	0.984	**24.99**	7.501	**190.52**				
	92.70	**137.90**	92.12	**137.08**	7.625	**193.67**	1.000	**25.40**	7.500	**190.50**				
9 3/4 **247.7**	59.20	**88.08**	58.18	**86.58**	8.560	**217.42**	0.595	**15.12**	8.404	**213.46**				
	62.60	**93.15**	55.19	**82.14**	8.625	**219.07**	0.563	**14.29**	8.469	**215.11**				
9 7/8 **250.8**	62.80	**93.43**	61.74	**91.89**	8.625	**219.07**	0.625	**15.88**	8.469	**215.11**				
	68.80	**102.37**	68.59	**102.08**	8.475	**215.26**	0.700	**17.78**	8.319	**211.30**				
	70.40	**104.76**	69.23	**103.02**	8.461	**214.91**	0.707	**17.96**	8.305	**210.95**				
	72.10	**107.28**	70.85	**105.44**	8.425	**213.99**	0.725	**18.42**	8.269	**210.03**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
10 **254.0**	22.75	**33.85**	21.86	**32.52**	9.582	**243.38**	0.209	**5.31**	9.426	**239.42**				
	30.25	**45.00**	29.37	**43.71**	9.434	**239.62**	0.283	**7.19**	9.278	**235.66**				
	30.07*	**44.74**	30.07	**44.76**	9.420	**239.27**	0.290	**7.37**	9.264	**235.31**				
	33.00	**49.10**	31.88	**47.45**	9.384	**238.35**	0.308	**7.83**	9.228	**234.39**				
	41.50	**61.74**	41.01	**61.03**	9.200	**233.68**	0.400	**10.16**	9.044	**229.72**				
	45.50	**67.69**	44.93	**66.86**	9.120	**231.65**	0.440	**11.18**	8.964	**227.69**				
	50.50	**75.13**	49.96	**74.35**	9.016	**229.01**	0.492	**12.50**	8.860	**225.04**				
	55.50	**82.57**	55.13	**82.04**	8.908	**226.26**	0.546	**13.87**	8.752	**222.30**				
	60.00	**89.27**	61.17	**91.04**	8.780	**223.01**	0.610	**15.50**	8.624	**219.05**				
10 3/4 **273.1**	32.75	**48.73**	31.20	**46.43**	10.192	**258.88**	0.279	**7.09**	10.036	**254.91**				
	35.75	**53.19**	34.24	**50.96**	10.136	**257.45**	0.307	**7.80**	9.980	**253.49**				
	40.00	**59.51**	38.66	**57.53**	10.054	**255.37**	0.348	**8.84**	9.898	**251.41**				
	40.50	**60.26**	38.88	**57.85**	10.050	**255.27**	0.350	**8.89**	9.894	**251.31**				
	45.00	**66.95**	43.68	**65.01**	9.960	**252.98**	0.395	**10.04**	9.804	**249.02**	11.75 **298.5**	8.00 **203.2**		
	45.50	**67.70**	44.22	**65.80**	9.950	**252.73**	0.400	**10.16**	9.794	**248.77**				10.63 **269.9**
	48.00	**71.41**	46.76	**69.59**	9.902	**251.51**	0.424	**10.77**	9.746	**247.55**				
	51.00	**75.88**	49.50	**73.67**	9.850	**250.19**	0.450	**11.43**	9.694	**243.23**				
	54.00	**80.34**	52.96	**78.82**	9.784	**248.51**	0.483	**12.27**	9.628	**244.55**				

* Plain End

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CASING DIMENSIONAL DATA

Casing O.D.	Weight T & C		Weight Plain End		Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths Round Short	API Cplg Lengths Round Long	API Cplg Lengths Butt-ress
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
	55.50	**82.57**	54.21	**80.68**	9.760	**247.90**	0.495	**12.58**	9.604	**243.94**	11.75 298.5	8.00 203.2		10.63 269.9
	60.70	**90.31**	59.40	**88.40**	9.660	**245.36**	0.545	**13.85**	9.504	**241.40**				
	65.70	**97.75**	64.53	**96.03**	9.560	**242.82**	0.595	**15.12**	9.404	**238.86**				
	71.10	**105.78**	70.12	**104.34**	9.450	**240.03**	0.650	**16.51**	9.294	**236.07**				
	73.20	**108.92**	72.33	**107.64**	9.406	**238.91**	0.672	**17.07**	9.250	**234.95**				
10 3/4 **273.1**	76.00	**113.07**	75.13	**111.81**	9.350	**237.49**	0.700	**17.78**	9.194	**233.53**				
	79.20	**117.83**	78.52	**116.85**	9.282	**235.76**	0.734	**18.65**	9.126	**231.80**				
	81.00	**120.51**	80.10	**119.20**	9.250	**234.95**	0.750	**19.05**	9.094	**230.99**				
	85.30	**126.92**	84.72	**126.08**	9.156	**232.56**	0.797	**20.25**	9.000	**228.60**				
	91.20	**135.70**	90.74	**135.04**	9.032	**229.41**	0.859	**21.82**	8.876	**225.45**				
	97.10	**144.48**	96.78	**144.02**	8.906	**226.21**	0.922	**23.42**	8.750	**222.25**				
	102.90	**153.11**	102.63	**152.74**	8.782	**223.06**	0.984	**25.00**	8.626	**219.10**				
	108.70	**161.75**	108.50	**161.47**	8.656	**219.86**	1.047	**26.60**	8.500	**215.90**				
	109.00	**162.19**	107.20	**159.54**	8.684	**220.57**	1.033	**26.24**	8.528	**216.61**				
11" **279.4**	26.75	**39.80**	25.78	**38.36**	10.552	**268.02**	0.224	**5.69**	10.396	**264.06**				
	35.39*	**52.65**	35.39	**52.67**	10.380	**263.65**	0.310	**7.88**	10.224	**259.69**				
11 3/4 **298.5**	38.00	**56.54**	36.69	**54.60**	11.150	**283.21**	0.300	**7.62**	10.994	**279.23**				
	42.00	**62.49**	40.60	**60.43**	11.084	**281.53**	0.333	**8.46**	10.928	**277.57**	12.75***	8.00		
	47.00	**69.93**	45.56	**67.80**	11.000	**279.40**	0.375	**9.53**	10.844	**275.44**	323.9	**203.2**		10.63 269.9

* Plain End

*** 11 3/4" Butteress Coupling, 12.755" O.D. (323.98mm)

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
11 3/4 298.5	50.00	74.34	48.49	72.16	10.950	278.13	0.400	10.16	10.794	274.17	12.75*** 323.9	8.00 203.2		10.63 269.9
	54.00	80.34	52.57	78.23	10.880	276.35	0.435	11.05	10.724	272.39				
	60.00	89.27	58.81	87.52	10.772	273.61	0.489	12.42	10.616	269.65				
	61.00	90.76	58.93	87.69	10.770	273.56	0.490	12.45	10.614	269.60				
	65.00	96.70	63.97	95.19	10.682	271.32	0.534	13.57	10.526	267.37				
	66.70	99.25	65.45	97.40	10.656	270.66	0.547	13.89	10.500	266.70				
	71.00	105.63	69.42	103.31	10.586	268.88	0.582	14.79	10.430	264.92				
	73.60	109.52	72.46	107.84	10.532	267.51	0.609	15.47	10.376	263.55				
	75.00	111.58	73.47	109.34	10.514	267.06	0.618	15.70	10.358	263.09				
	79.00	117.54	77.73	115.67	10.438	265.13	0.656	16.66	10.282	261.16				
	80.50	119.77	79.51	118.32	10.406	264.31	0.672	17.07	10.250	260.35				
	83.00	123.49	81.62	121.46	10.368	263.35	0.691	17.55	10.212	259.38				
	87.20	129.74	86.36	128.51	10.282	261.16	0.734	18.65	10.126	257.20				
11 7/8 301.6	71.80	106.82	70.20	104.46	10.711	272.06	0.582	14.78	10.555	268.10				
12 304.8	31.50	46.87	30.51	45.41	11.514	292.46	0.243	6.17	11.358	288.49				
	40.00	59.51	38.46	57.24	11.384	289.15	0.308	7.83	11.228	285.19				
	38.70*	57.58	40.52	60.31	11.350	288.24	0.325	8.28	11.194	284.33				

* Plain End

*** 11 3/4" Butteress Coupling, 12.755" O.D. (323.98mm)

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in **mm**	lb/ft	**kg/m**	lb/ft	**kg/m**	in	**mm**	in	**mm**	in	**mm**	in **mm**	in **mm**	in **mm**	in **mm**
12 3/4 **323.9**	43.00	**63.98**	41.19	**61.29**	12.130	**308.10**	0.310	**7.88**	11.974	**304.14**				
	45.45	**67.62**	43.77	**65.14**	12.090	**307.09**	0.330	**8.38**	11.934	**303.12**				
	51.15	**76.10**	49.56	**73.76**	12.000	**304.80**	0.375	**9.53**	11.844	**300.84**				
	53.00	**78.85**	51.48	**76.61**	11.970	**303.04**	0.390	**10.41**	11.814	**300.08**				
	65.42*	**97.33**	65.42	**97.35**	11.750	**298.45**	0.500	**12.70**	11.594	**294.49**				
13 **330.2**	36.50	**54.30**	35.24	**52.45**	12.482	**317.04**	0.259	**6.58**	12.326	**313.08**				
	40.00	**59.51**	38.17	**56.81**	12.438	**315.93**	0.281	**7.13**	12.282	**311.96**				
	45.00	**66.95**	43.34	**64.49**	12.360	**318.94**	0.320	**5.63**	12.204	**309.98**				
	47.29*	**70.36**	47.29	**70.37**	12.300	**312.42**	0.350	**8.89**	12.144	**308.46**				
	50.00	**74.39**	48.47	**72.13**	12.282	**311.96**	0.359	**9.12**	12.126	**308.00**				
	54.00	**80.34**	52.52	**78.16**	12.220	**309.88**	0.390	**10.16**	12.064	**306.43**				
13 3/8 **339.7**	48.00	**71.41**	45.98	**68.42**	12.715	**322.96**	0.330	**8.38**	12.559	**319.00**	14.38 **365.1**	8.00 **203.2**		10.63 **269.9**
	54.50	**81.09**	52.74	**78.49**	12.615	**320.42**	0.380	**9.65**	12.459	**316.46**				
	61.00	**90.76**	59.45	**88.47**	12.515	**317.88**	0.430	**10.92**	12.359	**313.92**				
	68.00	**101.17**	66.11	**98.38**	12.415	**315.34**	0.480	**12.19**	12.259	**311.38**				
	72.00	**107.12**	70.60	**105.07**	12.347	**313.61**	0.514	**13.06**	12.191	**309.65**				
	77.00	**114.56**	75.34	**112.11**	12.275	**311.78**	0.550	**13.97**	12.119	**307.82**				

* Plain End

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
13 3/8 **339.7**	80.70	**120.07**	79.26	**117.95**	12.215	**310.26**	0.580	**14.73**	12.059	**306.30**				
	83.00	**123.49**	81.86	**121.83**	12.175	**309.24**	0.600	**15.24**	12.019	**305.28**				
	85.00	**126.46**	82.90	**123.37**	12.159	**308.84**	0.608	**15.44**	12.003	**304.88**				
	86.00	**127.95**	85.11	**126.65**	12.125	**307.97**	0.625	**15.88**	11.969	**404.01**				
	91.00	**135.91**	89.63	**133.38**	12.055	**306.20**	0.660	**16.76**	11.899	**302.23**				
	92.00	**136.88**	91.17	**135.68**	12.031	**305.59**	0.672	**17.07**	11.875	**301.62**				
	96.00	**142.83**	94.76	**141.02**	11.975	**304.16**	0.700	**17.78**	11.819	**300.20**				
	98.00	**145.81**	97.19	**144.63**	11.937	**303.20**	0.719	**18.26**	11.781	**299.24**				
	100.30	**192.25**	99.10	**147.47**	11.907	**302.43**	0.734	**18.64**	11.751	**298.48**				
	102.00	**151.76**	99.60	**148.23**	11.899	**302.23**	0.738	**18.75**	11.743	**298.02**				
13 1/2 **342.9**	80.40	**119.64**	79.51	**118.32**	12.348	**313.64**	0.576	**14.63**	12.192	**309.68**				
	81.40	**121.11**	80.03	**119.10**	12.340	**313.40**	0.580	**14.75**	12.152	**308.66**				
13 5/8 **346.1**	88.20	**131.22**	86.78	**129.14**	12.375	**314.30**	0.625	**15.90**	12.187	**309.55**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing I.D.		Wall Thickness		Casing Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
14 **355.6**	42.00	**62.49**	40.45	**60.20**	13.448	**341.58**	0.276	**7.01**	13.261	**336.83**				
	50.00	**74.39**	47.89	**71.27**	13.344	**338.94**	0.328	**8.33**	13.157	**334.19**				
	51.02*	**75.91**	51.02	**75.93**	13.300	**337.82**	0.350	**8.89**	13.113	**333.07**				
	57.00	**84.80**	54.57	**81.21**	13.250	**336.55**	0.375	**9.53**	13.063	**331.80**				
	82.50	**122.76**	80.66	**120.03**	12.876	**327.05**	0.562	**14.28**	12.689	**322.30**				
	94.80	**141.06**	93.49	**139.13**	12.688	**322.28**	0.656	**16.66**	12.501	**317.53**				
	99.30	**147.76**	97.82	**145.57**	12.624	**320.65**	0.688	**17.48**	12.437	**315.90**				
	110.00	**163.68**	109.07	**162.31**	12.456	**316.38**	0.772	**19.61**	12.269	**311.63**				
	111.00	**165.17**	110.00	**163.69**	12.442	**316.03**	0.779	**19.79**	12.255	**311.28**				
14 **355.6** Vam Special Clearance	85.87*	**127.76**	85.87	**127.79**	12.800	**325.12**	0.600	**15.24**	12.613	**320.37**				
	92.67*	**137.88**	92.68	**137.92**	12.700	**322.58**	0.650	**16.51**	12.513	**317.83**				
	99.43*	**147.93**	99.43	**147.97**	12.600	**320.04**	0.700	**17.78**	12.413	**315.29**				
	106.13*	**157.90**	106.13	**157.94**	12.500	**317.50**	0.750	**19.05**	12.313	**312.75**				
	112.78*	**167.79**	112.78	**167.84**	12.400	**314.96**	0.800	**20.32**	12.213	**310.21**				
	119.37*	**177.60**	119.38	**177.65**	12.300	**312.42**	0.850	**21.59**	12.113	**307.67**				
15 **381.0**	47.50	**70.67**	45.71	**68.03**	14.418	**366.22**	0.291	**7.39**	14.231	**361.47**				
	61.15	**90.98**	58.57	**87.17**	14.250	**361.95**	0.375	**9.53**	14.063	**357.20**				
	59.33*	**82.27**	59.33	**88.30**	14.240	**361.70**	0.380	**9.65**	14.053	**356.95**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing Nom I.D.		Wall Thickness		Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in **mm**	lb/ft	**kg/m**	lb/ft	**kg/m**	in	**mm**	in	**mm**	in	**mm**	in **mm**	in **mm**	in **mm**	in **mm**
16 **406.4**	52.50	**78.11**	50.63	**75.35**	15.396	**391.06**	0.302	**7.67**	15.209	**386.31**				
	55.00	**81.84**	52.36	**77.92**	15.375	**390.52**	0.313	**7.94**	15.188	**385.77**				
	65.00	**96.71**	62.58	**93.13**	15.250	**387.35**	0.375	**9.52**	15.063	**382.60**				
	63.39*	**94.31**	63.39	**94.34**	15.240	**388.00**	0.380	**9.20**	15.053	**382.35**	17.00 **431.8**	9.00 **228.6**		
	70.00	**104.15**	66.81	**99.42**	15.198	**386.03**	0.401	**10.19**	15.011	**381.28**				
	75.00	**111.59**	72.72	**108.21**	15.125	**384.17**	0.438	**11.12**	14.938	**379.42**				10.63 **269.9**
	84.00	**124.98**	81.97	**121.98**	15.010	**381.25**	0.495	**12.58**	14.823	**376.50**				
	94.50	**140.62**	92.66	**137.90**	14.876	**377.85**	0.562	**14.28**	14.689	**373.10**				
	95.00	**141.36**	87.81	**130.67**	14.868	**379.41**	0.566	**13.50**	14.680	**374.65**				
	109.00	**162.17**	107.50	**159.98**	14.688	**373.08**	0.656	**16.66**	14.501	**368.32**				
	118.00	**175.56**	116.72	**173.70**	14.570	**370.08**	0.715	**18.16**	14.383	**365.33**				
	128.00	**190.44**	126.94	**188.91**	14.438	**366.73**	0.781	**19.84**	14.251	**361.98**				
	138.00	**205.34**	137.53	**204.67**	14.300	**363.22**	0.850	**21.59**	14.113	**358.47**				
	146.00	**217.22**	146.05	**217.35**	14.188	**360.38**	0.906	**23.01**	14.001	**355.63**				
16 1/8 **407.9**	95.60	**142.25**	94.13	**140.09**	14.992	**380.81**	0.567	**13.59**	14.805	**376.04**				
17 **431.8**	73.20	**108.90**	69.70	**103.73**	16.214	**411.84**	0.393	**9.98**	16.027	**407.09**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing Nom I.D.		Wall Thickness		Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
18 457.2	70.58*	105.01	70.59	105.05	17.250	438.15	0.375	9.53	17.063	433.40				
	78.00	116.05	75.74	112.71	17.194	436.73	0.403	10.24	17.007	431.98				
	80.00	119.02	77.02	114.62	17.180	436.37	0.410	10.42	16.993	431.62				
	84.00	124.98	82.15	122.26	17.124	434.95	0.438	11.13	16.937	430.20				
	87.50	130.18	85.44	127.15	17.088	434.04	0.456	11.58	16.901	429.28				
	96.50	143.57	94.72	140.96	16.986	431.44	0.507	12.88	16.799	426.69				
18 5/8 473.1	73.09*	108.74	73.09	108.77	17.875	454.02	0.375	9.53	17.688	449.28				
	78.00	116.05	75.00	111.61	17.855	453.52	0.385	9.78	17.668	448.76				
	87.50	130.18	84.51	125.76	17.755	450.98	0.435	11.05	17.568	446.23	20.00 508.0	9.00 228.6		10.63 269.9
	94.50	140.62	90.75	135.06	17.689	449.30	0.468	11.89	17.502	444.55				
	96.50	143.57	93.96	139.83	17.655	448.44	0.485	12.32	17.468	443.69				
	97.70	145.38	94.15	140.11	17.653	448.38	0.486	12.34	17.465	443.61				
	99.00	147.31	96.79	144.04	17.625	447.61	0.500	12.74	17.438	442.93				
	105.00	156.24	102.61	152.71	17.563	446.10	0.531	13.49	17.376	441.35				
	109.00	162.17	109.35	162.74	17.491	444.27	0.567	14.41	17.304	439.52				
	112.00	166.66	111.59	166.07	17.467	443.66	0.579	14.71	17.280	438.91				
	115.00	171.12	114.39	170.23	17.437	442.90	0.594	15.09	17.250	438.15				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing Nom I.D.		Wall Thickness		Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in **mm**	lb/ft	**kg/m**	lb/ft	**kg/m**	in	**mm**	in	**mm**	in	**mm**	in **mm**	in **mm**	in **mm**	in **mm**
18 5/8 **473.1**	122.00	**181.50**	119.22	**177.42**	17.385	**441.58**	0.620	**15.75**	17.198	**436.83**				
	126.00	**187.49**	132.72	**197.51**	17.239	**437.87**	0.693	**17.61**	17.052	**433.12**				
	126.00	**187.49**	122.19	**181.84**	17.353	**440.77**	0.636	**16.16**	17.166	**436.02**				
	133.00	**197.92**	132.72	**197.51**	17.239	**437.87**	0.693	**17.61**	17.052	**433.12**				
	138.00	**205.34**	137.68	**204.90**	17.185	**436.50**	0.720	**18.29**	16.998	**431.75**				
20 **508**	84.75	**126.16**	84.76	**126.13**	19.190	**487.43**	0.405	**10.29**	19.002	**482.65**				
	85.60	**127.40**	85.58	**127.35**	19.182	**487.22**	0.409	**10.39**	18.995	**482.47**				
	90.00	**133.90**	87.22	**129.79**	19.166	**486.82**	0.417	**10.59**	18.979	**482.07**				
	94.00	**139.85**	91.51	**136.18**	19.124	**485.75**	0.438	**11.13**	18.936	**480.97**				
	104.10**	**154.89**	104.13	**154.96**	19.000	**482.60**	0.500	**12.70**	18.812	**477.82**				
	106.50	**158.45**	104.13	**154.96**	19.000	**482.60**	0.500	**12.70**	18.812	**477.82**	21.00 **533.4**	9.00 **228.6**	11.50 **292.1**	10.63 **269.9**
	118.50	**176.33**	116.87	**173.93**	18.874	**479.40**	0.563	**14.30**	18.687	**474.65**				
	131.00	**194.95**	129.33	**192.46**	18.750	**476.25**	0.625	**15.88**	18.563	**471.50**				
	133.00	**197.90**	131.33	**195.44**	18.730	**475.74**	0.635	**16.13**	18.542	**470.97**				
	141.90	**211.15**	142.00	**211.32**	18.623	**473.02**	0.688	**17.49**	18.436	**468.27**				
	147.00	**218.74**	146.08	**217.38**	18.582	**471.98**	0.709	**18.01**	18.395	**467.23**				
	154.20**	**229.45**	154.19	**229.47**	18.500	**469.90**	0.750	**19.05**	18.313	**465.15**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing Nom I.D.		Wall Thickness		Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
20 508.0	169.00	251.44	166.40	247.64	18.376	466.75	0.812	20.63	18.188	461.98				
	175.00	260.40	172.48	256.67	18.314	465.18	0.843	21.41	18.126	460.40				
	184.80	275.00	184.76	274.95	18.188	461.98	0.906	23.01	18.001	457.23				
	202.90	301.92	202.92	301.98	18.000	457.20	1.000	25.40	17.813	452.45				
	250.30*	372.45	250.32	372.51	17.500	444.50	1.250	31.75	17.313	439.75				
21 1/2 546.1	92.50	137.62	89.03	132.50	20.710	526.03	0.395	10.04	20.522	521.26				
	103.00	153.24	100.07	148.92	20.610	523.49	0.445	10.04	20.422	518.72				
	114.00	169.61	111.05	165.26	20.510	520.95	0.495	12.58	20.322	516.18				
22 558.8	92.50*	137.62	89.78	133.61	21.222	539.04	0.389	9.88	21.035	534.29				
	103.00	153.24	100.41	149.43	21.128	536.65	0.436	11.08	20.941	531.90				
	101.00*	150.27	100.75	149.94	21.125	536.57	0.438	11.12	20.938	531.83				
	114.00	169.61	111.67	166.18	21.028	534.11	0.486	12.35	20.841	529.36				
	114.80*	170.80	114.81	170.86	21.000	533.40	0.500	12.70	20.813	528.65				
	142.70**	212.34	142.68	212.33	20.750	527.05	0.625	15.88	20.563	522.30				
	170.20**	253.26	170.22	253.31	20.500	520.70	0.750	19.05	20.313	515.95				
	224.30**	333.76	224.28	333.77	20.000	508.00	1.000	25.40	19.813	503.25				
	277.00**	412.18	277.02	412.25	19.500	495.30	1.250	31.75	19.313	490.55				

* Plain End

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing Nom I.D.		Wall Thickness		Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
	94.62*	**140.81**	94.62	**140.81**	23.250	**590.55**	0.375	**9.53**	23.062	**585.79**				
	100.50	**149.52**	97.60	**145.24**	23.226	**589.84**	0.387	**9.88**	23.039	**585.19**				
	113.00	**168.12**	110.22	**164.03**	23.124	**587.35**	0.438	**11.13**	22.937	**582.60**				
	125.49*	**186.75**	125.49	**186.75**	23.000	**584.20**	0.500	**12.70**	22.812	**579.44**				
	140.68*	**209.36**	140.19	**208.63**	22.880	**581.15**	0.560	**14.23**	22.692	**576.39**				
	155.00*	**230.61**	156.03	**232.20**	22.750	**577.85**	0.625	**15.88**	22.562	**573.07**				
24	171.29*	**254.91**	171.78	**255.63**	22.620	**574.55**	0.690	**17.53**	22.432	**569.79**				
609.6	190.46	**128.00**	125.49	**186.75**	23.000	**584.20**	0.500	**12.70**	22.813	**579.45**				
	238.35*	**354.70**	238.59	**355.05**	22.060	**560.32**	0.970	**24.64**	21.872	**555.56**				
	241.06	**162.00**	158.46	**235.81**	22.730	**577.34**	0.635	**16.13**	25.543	**648.79**				
	245.52	**165.00**	162.10	**241.23**	22.700	**576.58**	0.650	**16.51**	22.513	**571.83**				
	258.91	**174.00**	171.30	**254.92**	22.624	**574.65**	0.688	**17.48**	22.437	**569.90**				
	281.23*	**189.00**	186.24	**277.15**	22.500	**571.50**	0.750	**19.05**	22.313	**566.75**				
	302.07	**203.00**	201.09	**299.26**	22.376	**568.35**	0.812	**20.63**	22.189	**563.60**				
	304.00	**452.29**	303.72	**451.98**	21.500	**546.10**	1.250	**31.75**	21.313	**541.35**				
	365.45**	**245.60**	245.64	**365.56**	22.000	**558.80**	1.000	**25.40**	21.813	**554.05**				
	536.42**	**360.50**	360.46	**536.42**	21.000	**533.40**	1.500	**38.10**	20.813	**528.65**				

* Plain End

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing Nom I.D.		Wall Thickness		Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
24 1/2 **622.3**	88.00	**130.93**	83.91	**124.88**	23.850	**605.79**	0.325	**8.26**	23.663	**601.04**				
	100.50	**149.52**	96.62	**143.79**	23.750	**603.25**	0.375	**9.52**	23.562	**598.47**				
	113.00	**168.12**	109.28	**162.62**	23.650	**600.71**	0.425	**10.80**	23.462	**595.93**				
	197.90	**133.00**	128.16	**190.73**	23.500	**596.90**	0.500	**12.70**	23.313	**592.15**				
	208.32	**140.00**	135.93	**202.29**	23.438	**595.33**	0.531	**13.49**	23.251	**590.58**				
	241.06	**162.00**	159.37	**237.17**	23.250	**590.55**	0.625	**15.88**	23.063	**585.80**				
	245.52	**165.00**	161.85	**240.86**	23.230	**590.04**	0.635	**16.13**	23.043	**585.29**				
26 **660.4**	85.60*	**127.39**	85.60	**127.38**	25.376	**644.25**	0.312	**8.07**	25.188	**639.79**				
	136.17*	**202.64**	136.17	**202.65**	25.000	**635.00**	0.500	**12.70**	24.812	**630.24**				
	202.26*	**300.99**	202.26	**300.99**	24.500	**622.30**	0.750	**19.05**	24.312	**617.54**				
	252.07*	**169.40**	169.38	**252.07**	24.750	**628.65**	0.625	**15.88**	24.562	**623.87**				
	265.00*	**394.36**	267.00	**397.35**	24.000	**609.60**	1.000	**25.40**	23.812	**604.82**				
	301.02*	**202.30**	202.26	**300.99**	24.500	**622.30**	0.750	**19.05**	24.313	**617.55**				
	331.82	**223.00**	218.44	**325.07**	24.376	**619.15**	0.812	**20.63**	24.189	**614.40**				
	352.66	**237.00**	232.46	**345.95**	24.268	**616.41**	0.866	**22.00**	24.081	**611.66**				
	397.30*	**267.00**	267.00	**397.35**	24.000	**609.60**	1.000	**25.40**	23.813	**604.85**				
	491.64*	**330.40**	330.42	**491.72**	23.500	**596.90**	1.250	**31.75**	23.313	**592.15**				
	584.04*	**392.50**	392.50	**584.10**	23.000	**584.20**	1.500	**38.10**	22.813	**579.45**				

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CASING DIMENSIONAL DATA

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	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
28 **711.1**	146.90**	**218.59**	146.85	**218.54**	27.000	**685.80**	0.500	**12.66**	26.813	**681.05**				
	182.70**	**271.86**	182.73	**271.93**	26.750	**679.45**	0.625	**15.84**	26.563	**674.70**				
	218.30**	**324.83**	218.28	**324.83**	26.500	**673.10**	0.750	**19.01**	26.313	**668.35**				
	288.40**	**429.14**	288.36	**429.13**	26.000	**660.40**	1.000	**25.36**	25.813	**658.19**				
	357.10**	**531.37**	357.12	**531.45**	25.500	**647.70**	1.250	**31.71**	25.313	**642.95**				
	424.40**	**631.66**	424.54	**631.78**	25.000	**635.00**	1.500	**38.06**	24.813	**630.25**				
30 **762.0**	157.73*	**234.73**	157.53	**234.43**	29.000	**736.60**	0.500	**12.70**	28.812	**731.84**				
	196.10**	**291.80**	196.08	**291.80**	28.750	**730.25**	0.625	**15.88**	28.563	**725.50**				
	234.29*	**348.66**	234.30	**348.67**	28.500	**736.90**	0.750	**12.55**	28.313	**719.15**				
	235.00	**349.63**	234.30	**348.67**	28.500	**723.90**	0.750	**19.05**	28.313	**719.15**				
	309.72*	**460.92**	309.72	**460.92**	28.000	**711.20**	1.000	**25.40**	27.813	**706.45**				
	310.00	**461.22**	309.72	**460.92**	28.000	**711.20**	1.000	**25.40**	27.813	**706.45**				
	383.81*	**571.17**	383.82	**571.18**	27.500	**698.50**	1.250	**31.75**	27.312	**693.74**				
	453.15*	**674.36**	456.58	**679.46**	27.000	**685.80**	1.500	**38.10**	26.812	**581.04**				
	524.04*	**779.86**	528.00	**785.75**	26.500	**673.10**	1.750	**44.45**	26.312	**668.34**				
	533.00*	**793.00**	528.00	**785.75**	26.500	**673.10**	1.750	**44.45**	26.312	**668.34**				
	593.60	**883.38**	598.09	**890.05**	26.000	**660.40**	2.000	**50.80**	25.812	**655.64**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing Nom I.D.		Wall Thickness		Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in **mm**	lb/ft	**kg/m**	lb/ft	**kg/m**	in	**mm**	in	**mm**	in	**mm**	in **mm**	in **mm**	in **mm**	in **mm**
32 **812.8**	250.30	**372.45**	250.32	**372.51**	30.500	**774.70**	0.750	**19.05**	30.313	**769.95**				
	331.10	**492.68**	331.08	**492.71**	30.000	**762.00**	1.000	**25.40**	29.813	**757.25**				
	410.50	**610.82**	410.52	**610.92**	29.500	**749.30**	1.250	**31.75**	29.313	**744.55**				
	488.60	**727.04**	488.62	**727.14**	29.000	**736.60**	1.500	**38.10**	28.813	**731.85**				
	565.40	**841.32**	565.38	**841.38**	28.500	**723.90**	1.750	**44.45**	28.313	**719.15**				
	640.80	**953.51**	640.81	**953.63**	28.000	**711.20**	2.000	**50.80**	27.813	**706.45**				
34 **863.6**	266.30	**396.25**	266.34	**396.35**	32.500	**825.50**	0.750	**19.05**	32.313	**820.75**				
	352.40	**524.37**	352.45	**524.50**	32.000	**812.80**	1.000	**25.40**	31.813	**808.05**				
	437.20	**650.55**	437.22	**650.65**	31.500	**800.10**	1.250	**31.75**	31.313	**795.35**				
	520.70	**774.80**	520.66	**774.82**	31.000	**787.40**	1.500	**38.10**	30.813	**782.65**				
	602.80	**896.97**	602.76	**897.01**	30.500	**774.70**	1.750	**44.45**	30.313	**769.95**				
	683.50	**1017.05**	683.53	**1017.20**	30.000	**762.00**	2.000	**50.80**	29.813	**757.25**				
36 **914.4**	282.40	**420.93**	282.36	**420.19**	34.500	**876.30**	0.750	**19.05**	34.313	**871.55**				
	374.00	**556.40**	373.81	**556.28**	34.000	**863.60**	1.000	**25.40**	33.812	**858.82**				
	463.90	**690.28**	463.92	**690.39**	33.500	**850.90**	1.250	**31.75**	33.313	**846.15**				
	551.00	**819.78**	519.65	**773.33**	33.187	**842.95**	1.407	**35.73**	33.000	**838.20**				
	552.70	**822.42**	552.70	**822.51**	33.000	**838.20**	1.500	**38.10**	32.813.	**833.45**				
	640.10	**952.47**	640.14	**952.64**	32.500	**825.50**	1.750	**44.45**	32.313	**820.75**				
	726.20	**1080.59**	726.25	**1080.78**	32.000	**812.80**	2.000	**50.80**	31.813	**808.05**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing Nom I.D.		Wall Thickness		Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
38 **965.2**	298.40	**444.02**	298.38	**444.03**	36.500	**927.10**	0.750	**19.05**	36.313	**922.35**				
	395.20	**588.06**	395.17	**588.07**	36.000	**914.40**	1.000	**25.40**	35.813	**909.65**				
	490.60	**730.01**	490.62	**730.12**	35.500	**901.70**	1.250	**31.75**	35.313	**896.95**				
	584.70	**870.03**	584.74	**870.19**	35.000	**889.00**	1.500	**38.10**	34.813	**884.25**				
	677.50	**1008.12**	677.52	**1008.26**	34.500	**876.30**	1.750	**44.45**	34.313	**871.55**				
	769.00	**1144.27**	768.97	**1144.36**	34.000	**863.60**	2.000	**50.80**	33.813	**858.85**				
40 **1016.0**	314.40	**467.83**	314.40	**467.87**	38.500	**977.90**	0.750	**19.05**	38.313	**973.15**				
	416.50	**619.75**	416.53	**619.86**	38.000	**965.20**	1.000	**25.40**	37.813	**960.45**				
	517.30	**769.74**	517.32	**769.86**	37.500	**952.50**	1.250	**31.75**	37.313	**947.75**				
	616.80	**917.80**	616.78	**917.87**	37.000	**939.80**	1.500	**38.10**	36.813	**935.05**				
	714.90	**1063.77**	714.90	**1063.89**	36.500	**927.10**	1.750	**44.45**	36.313	**922.35**				
	811.70	**1207.81**	811.69	**1207.93**	36.000	**914.40**	2.000	**50.80**	35.813	**909.65**				
	907.10	**1349.76**	907.15	**1349.98**	35.500	**901.70**	2.250	**57.15**	35.313	**896.95**				
42 **1066.8**	330.40	**491.64**	330.42	**491.72**	40.500	**1028.70**	0.750	**19.05**	40.313	**1023.95**				
	437.90	**651.60**	437.89	**651.65**	40.000	**1016.00**	1.000	**25.40**	39.813	**1011.25**				
	544.00	**809.47**	544.02	**809.59**	39.500	**1003.30**	1.250	**31.75**	39.313	**998.55**				
	648.80	**965.41**	648.82	**965.55**	39.000	**990.60**	1.500	**38.10**	38.813	**985.85**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing Nom I.D.		Wall Thickness		Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
42 **1066.8**	752.30	**1119.42**	752.28	**1119.52**	38.500	**977.90**	1.750	**44.45**	38.313	**973.15**				
	854.40	**1271.34**	854.41	**1271.51**	38.000	**965.20**	2.000	**50.80**	37.813	**960.45**				
	955.20	**1421.34**	955.21	**1421.50**	37.500	**952.50**	2.250	**57.15**	37.313	**947.75**				
44 **1117.6**	346.40	**515.44**	346.44	**515.56**	42.500	**1079.50**	0.750	**19.05**	42.313	**1074.75**				
	459.20	**683.29**	459.25	**683.43**	42.000	**1066.80**	1.000	**25.40**	41.813	**1062.05**				
	570.70	**849.20**	570.72	**849.33**	41.500	**1054.10**	1.250	**31.75**	41.313	**1049.35**				
	680.90	**1013.18**	680.86	**1013.23**	41.000	**1041.40**	1.500	**38.10**	40.813	**1036.65**				
	789.70	**1175.07**	789.66	**1175.15**	40.500	**1028.70**	1.750	**44.45**	40.313	**1023.95**				
	897.10	**1334.88**	897.13	**1335.08**	40.000	**1016.00**	2.000	**50.80**	39.813	**1011.25**				
	1003.30	**1492.91**	1003.27	**1493.03**	39.500	**990.60**	2.250	**63.50**	39.313	**998.55**				
46 **1168.4**	362.50	**539.40**	362.46	**539.40**	44.500	**1130.30**	0.750	**19.05**	44.313	**1125.55**				
	480.60	**715.13**	480.61	**715.22**	44.000	**1117.60**	1.000	**25.40**	43.813	**1112.85**				
	597.40	**888.93**	597.42	**889.06**	43.500	**1104.90**	1.250	**31.75**	43.313	**1100.15**				
	712.90	**1060.80**	712.90	**1060.91**	43.000	**1092.20**	1.500	**38.10**	42.813	**1087.45**				
	827.00	**1230.58**	827.04	**1230.78**	42.500	**1079.50**	1.750	**44.45**	42.313	**1074.75**				
	939.80	**1398.42**	939.85	**1398.66**	42.000	**1066.80**	2.000	**50.80**	41.813	**1062.05**				
	1051.30	**1564.33**	1051.33	**1564.55**	41.500	**1054.10**	2.250	**57.15**	41.313	**1049.35**				
	1161.50	**1728.31**	1161.47	**1728.45**	41.000	**1041.40**	2.500	**63.50**	40.813	**1036.65**				

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CASING DIMENSIONAL DATA

Casing O.D.	Weight				Casing Nom I.D.		Wall Thickness		Drift I.D.		API Cplg O.D.	API Cplg Lengths		
	T & C		Plain End									Round		Butt-ress
												Short	Long	
in mm	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in mm	in mm	in mm	in mm
48 **1219.2**	378.50	**563.21**	378.48	**563.24**	46.500	**1181.10**	0.750	**19.05**	46.313	**1176.35**				
	502.00	**746.98**	501.97	**747.01**	46.000	**1168.40**	1.000	**25.40**	45.813	**1163.65**				
	624.10	**928.66**	624.12	**928.80**	45.500	**1155.70**	1.250	**31.75**	45.313	**1150.95**				
	744.90	**1108.41**	744.94	**1108.59**	45.000	**1143.00**	1.500	**38.10**	44.813	**1138.25**				
	864.40	**1286.23**	864.43	**1286.41**	44.500	**1130.30**	1.750	**44.45**	44.313	**1125.55**				
	982.60	**1462.11**	982.57	**1462.23**	44.000	**1117.60**	2.000	**50.80**	43.813	**1112.85**				
	1099.40	**1635.91**	1099.39	**1636.07**	43.500	**1104.90**	2.250	**57.15**	43.313	**1100.15**				
	1214.90	**1807.77**	1214.87	**1807.92**	43.000	**1092.20**	2.500	**63.50**	42.813	**1087.45**				

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
4 1/2	114.3	H-40	9.5	14.1	2760	19.0	3190	22.0	3190	22.0	-	-	111	49	77	34	-	-	-	-
		J-55	9.5	14.1	3310	22.8	4380	30.2	4380	30.2	-	-	152	68	101	45	-	-	-	-
		J-55	10.5	15.6	4010	27.6	4790	33.0	4790	33.0	4790	33.0	166	74	132	59	-	-	203	90
		J-55	11.6	17.3	4960	34.2	5350	36.9	5350	36.9	5350	36.9	184	82	154	69	162	72	225	100
		J-55	13.5	20.1	6420	44.3	6200	42.7	6200	42.7	6200	42.7	211	94	186	83	196	87	258	115
		J-55	15.1	22.5	7620	52.5	7210	49.7	7070	48.7	6740	46.5	242	108	224	100	236	105	297	132
		J-55	16.6	24.7	8360	57.6	7980	55.0	7320	50.5	6740	46.5	266	118	-	-	265	118	322	143
		J-55	18.8	28.0	9510	65.6	9200	63.4	7320	50.5	6740	46.5	302	134	-	-	311	138	322	143
		J-55	21.6	32.1	10860	74.9	10690	73.7	7320	50.5	6740	46.5	346	154	-	-	365	162	322	143
		J-55	24.6	36.6	11990	82.7	11980	82.6	7320	50.5	6740	46.5	381	169	-	-	410	182	322	143
		J-55	26.5	39.4	13240	91.3	13480	92.9	7320	50.5	6740	46.5	421	187	-	-	460	205	322	143
		M-65	9.5	14.1	3600	24.8	5180	35.7	5180	35.7	-	-	180	80	118	52	-	-	-	-
		M-65	10.5	15.6	4430	30.5	5660	39.0	5660	39.0	5660	39.0	196	87	154	69	-	-	231	103
		M-65	11.6	17.3	5560	38.3	6320	43.6	6320	43.6	6320	43.6	217	97	-	-	188	84	256	114
		M-65	13.5	20.1	7310	50.4	7330	50.5	7330	50.5	7330	50.5	249	111	-	-	228	101	295	131

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
4 1/2	114.3	C-75	11.6	17.3	6100	42.1	7290	50.3	7290	50.3	7290	50.3	250	111	-	-	212	94	288	128
		C-75	13.5	20.1	8140	56.1	8460	58.3	8460	58.3	8460	58.3	288	128	-	-	257	114	331	147
		C-75	15.1	22.5	10390	71.6	9830	67.8	9640	66.5	9190	63.4	331	147	297	132	308	137	380	169
		C-75	16.6	24.7	11400	78.6	10880	75.0	9990	68.9	9190	63.4	363	161	-	-	347	154	407	181
		C-75	18.8	28.0	12960	89.4	12540	86.5	9990	68.9	9190	63.4	412	183	-	-	407	181	407	181
		C-75	21.6	32.1	14810	102.1	14580	100.5	9990	68.9	9190	63.4	471	210	-	-	478	213	407	181
		C-75	24.6	36.6	16340	112.7	16330	112.6	9990	68.9	9190	63.4	520	231	-	-	536	238	407	181
		C-75	26.5	39.4	18060	124.5	18380	126.7	9990	68.9	9190	63.4	574	255	-	-	602	268	407	181
		L-80	11.6	17.3	6350	43.8	7780	53.6	7780	53.6	7780	53.6	267	119	-	-	211	94	291	129
		L-80	13.5	20.1	8540	58.9	9020	62.2	9020	62.2	9020	62.2	307	137	-	-	256	114	334	149
		L-80	15.1	22.5	11080	76.4	10480	72.3	10280	70.9	9800	67.6	353	157	308	137	308	137	384	171
		L-80	16.6	24.7	12160	83.8	11600	80.0	10650	73.4	9800	67.6	387	172	-	-	347	154	407	181
		L-80	18.8	28.0	13830	95.4	13380	92.3	10650	73.4	9800	67.6	440	196	-	-	407	181	407	181
		L-80	21.6	32.1	15800	108.9	15560	107.3	10650	73.4	9800	67.6	503	224	-	-	478	213	407	181
		L-80	24.6	36.6	17430	120.2	17420	120.1	10650	73.4	9800	67.6	555	247	-	-	536	238	407	181
		L-80	26.5	39.4	19260	132.8	19600	135.1	10650	73.4	9800	67.6	613	273	-	-	602	268	407	181
		C-90	11.6	17.3	6820	47.0	8750	60.3	8750	60.3	8750	60.3	300	133	-	-	222	99	309	137
		C-90	13.5	20.1	9300	64.1	10150	70.0	10150	70.0	10150	70.0	345	153	-	-	270	120	355	158

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
4 1/2	114.3	C-95	11.6	17.3	7030	48.5	9240	63.7	9240	63.7	9240	63.7	317	141	-	-	234	104	325	145
		C-95	13.5	20.1	9660	66.6	10710	73.8	10710	73.8	10710	73.8	364	162	-	-	283	126	373	166
		P-110	11.6	17.3	7580	52.3	10690	73.7	10690	73.7	10690	73.7	367	163	-	-	278	124	385	171
		P-110	13.5	20.1	10690	73.7	12410	85.6	12410	85.6	12410	85.6	422	188	-	-	337	150	443	197
		P-110	15.1	22.5	14340	98.9	14420	99.4	14420	99.4	13460	92.8	485	216	-	-	405	180	509	226
		P-110	16.6	24.7	16720	115.3	15960	110.0	14650	101.0	13470	92.9	532	237	-	-	457	203	536	238
		P-110	18.8	28.0	19010	131.1	18390	126.8	14650	101.0	13470	92.9	605	269	-	-	535	238	536	238
		P-110	21.6	32.1	21730	149.8	21390	147.5	14650	101.0	13470	92.9	691	307	-	-	628	279	536	238
		P-110	24.6	36.6	23970	165.3	23960	165.2	14650	101.0	13470	92.9	762	339	-	-	705	314	536	238
		P-110	26.5	39.4	26490	182.6	26950	185.8	14650	101.0	13470	92.9	843	375	-	-	792	352	536	238
		Q-125	15.1	22.5	15830	109.1	16380	112.9	16380	112.9	15300	105.5	551	245	-	-	438	195	554	246
5	127.0	J-55	11.5	17.1	3060	21.1	4240	29.2	4240	29.2	-	-	182	81	133	59	-	-	-	-
		J-55	13.0	19.3	4140	28.5	4870	33.6	4870	33.6	4870	33.6	208	93	169	75	182	81	252	112
		J-55	15.0	22.3	5560	38.3	5700	39.3	5700	39.3	5700	39.3	241	107	207	92	223	99	293	130
		J-55	18.0	26.8	7390	51.0	6970	48.1	6970	48.1	6970	48.1	290	129	263	117	284	126	353	157
		J-55	20.3	30.2	8240	56.8	7850	54.1	7440	51.3	6820	47.0	324	144	-	-	326	145	394	175
		J-55	20.8	31.0	8500	58.6	8120	56.0	7440	51.3	6820	47.0	334	149	-	-	339	151	403	179
		J-55	23.2	34.5	9510	65.6	9200	63.4	7080	48.8	7440	51.3	373	166	359	160	388	173	403	179
		J-55	24.1	35.9	9900	68.3	9630	66.4	7080	48.8	7440	51.3	389	173	377	168	407	181	403	179

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
5	127.0	M-65	11.5	17.1	3290	22.7	5010	34.5	5010	34.5	-	-	215	96	155	69	-	-	-	-
		M-65	13.0	19.3	4590	31.6	5760	39.7	5760	39.7	5760	39.7	245	109	196	87	212	94	288	128
		M-65	15.0	22.3	6280	43.3	6730	46.4	6730	46.4	6730	46.4	284	126	-	-	259	115	334	149
		M-65	18.0	26.8	8730	60.2	8240	56.8	8240	56.8	8240	56.8	343	153	-	-	331	147	402	179
		M-65	21.4	31.8	10370	71.5	9940	68.5	9940	68.5	9910	68.3	407	181	-	-	409	182	478	213
		C-75	13.0	19.3	4970	34.3	6640	45.8	6640	45.8	6640	45.8	283	126	224	100	241	107	323	144
		C-75	15.0	22.3	6940	47.8	7770	53.6	7770	53.6	7770	53.6	328	146	-	-	295	131	375	167
		C-75	18.0	26.8	9960	68.7	9500	65.5	9500	65.5	9290	64.1	396	176	-	-	376	167	452	201
		C-75	20.3	30.2	11240	77.5	10710	73.8	10140	69.9	9290	64.1	441	196	-	-	432	192	505	225
		C-75	20.8	31.0	11590	79.9	11080	76.4	10140	69.9	9290	64.1	455	202	-	-	448	199	510	227
		C-75	21.4	31.8	11970	82.5	11470	79.1	10140	69.9	9290	64.1	470	209	-	-	466	207	510	227
		C-75	23.2	34.5	12970	89.4	12550	86.5	10140	69.9	9290	64.1	509	226	-	-	513	228	510	227
		C-75	24.1	35.9	13500	93.1	13130	90.5	10140	69.9	9290	64.1	530	236	-	-	538	239	510	227

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
5	127.0	L-80	13.0	19.3	5140	35.4	7080	48.8	7080	48.8	7080	48.8	302	134	233	-	241	107	327	145
		L-80	15.0	22.3	7250	50.0	8290	57.2	8290	57.2	8290	57.2	350	156	-	-	295	131	379	169
		L-80	18.0	26.8	10490	72.3	10140	69.9	10140	69.9	9910	68.3	422	188	-	-	376	167	457	203
		L-80	20.3	30.2	11990	82.7	11420	78.7	10820	74.6	9910	68.3	471	210	-	-	432	192	510	227
		L-80	20.8	31.0	12360	85.2	11820	81.5	10820	74.6	9910	68.3	486	216	-	-	448	199	510	227
		L-80	21.4	31.8	12760	88.0	12240	84.4	10810	74.5	9910	68.3	501	223	-	-	465	207	509	226
		L-80	23.2	34.5	13830	95.4	13380	92.3	10810	74.5	9910	68.3	543	242	-	-	513	228	509	226
		L-80	24.1	35.9	14400	99.3	14000	96.5	10810	74.5	9910	68.3	565	251	-	-	538	239	509	226
		C-90	15.0	22.3	7830	54.0	9320	64.3	9320	64.3	9320	64.3	394	175	-	-	310	138	404	180
		C-90	18.0	26.8	11520	79.4	11400	78.6	11400	78.6	11150	76.9	475	211	-	-	396	176	487	217
		C-90	21.4	31.8	14360	99.0	13770	94.9	12170	83.9	11150	76.9	564	251	-	-	490	218	536	238
		C-90	23.2	34.5	15560	107.3	15060	103.8	12170	83.9	11150	76.9	611	272	-	-	540	240	536	238
		C-90	24.1	35.9	16200	111.7	15750	108.6	12170	83.9	11150	76.9	636	283	-	-	566	252	536	238
		C-95	15.0	22.3	8110	55.9	9840	67.8	9840	67.8	9840	67.8	416	185	-	-	326	145	424	189
		C-95	18.0	26.8	12030	82.9	12040	83.0	12040	83.0	11770	81.2	501	223	-	-	416	185	512	228
		C-95	21.4	31.8	15150	104.5	14530	100.2	12840	88.5	11770	81.2	595	265	-	-	514	229	563	250
		C-95	23.2	34.5	16430	113.3	15890	109.6	12840	88.5	11770	81.2	645	287	-	-	567	252	563	250
		C-95	24.1	35.9	17100	117.9	16630	114.7	12840	88.5	11770	81.2	672	299	-	-	595	265	563	250

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
5	127.0	P-110	13.0	19.3	5840	40.3	9740	67.2	9740	67.2	9740	67.2	415	185	316	141	317	141	434	193
		P-110	15.0	22.3	8850	61.0	11400	78.6	11400	78.6	11400	78.6	481	214	-	-	388	173	503	224
		P-110	18.0	26.8	13470	92.9	13940	96.1	13940	96.1	13620	93.9	580	258	-	-	495	220	606	270
		P-110	20.3	30.2	16490	113.7	15710	108.3	14880	102.6	13630	94.0	647	288	-	-	568	253	671	298
		P-110	20.8	31.0	17000	117.2	16250	112.0	14880	102.6	13630	94.0	668	297	-	-	590	262	671	298
		P-110	21.4	31.8	17550	121.0	16820	116.0	14870	102.5	13620	93.9	689	306	-	-	612	272	670	298
		P-110	23.2	34.5	19020	131.1	18400	126.9	14870	102.5	13620	93.9	747	332	-	-	675	300	670	298
		P-110	24.1	35.9	19800	136.5	19250	132.7	14870	102.5	13620	93.9	778	346	-	-	708	315	670	298
		Q125	18.0	26.8	14820	102.2	15840	109.2	15840	109.2	15480	106.7	659	293	-	-	534	238	661	294
		Q125	21.4	31.8	19940	137.5	19120	131.8	16900	116.5	15480	106.7	783	348	-	-	661	294	724	322
		Q125	23.2	34.5	21620	149.1	20910	144.2	16900	116.5	15480	106.7	849	378	-	-	729	324	724	322
		Q125	24.1	35.9	22500	155.1	21880	150.9	16900	116.5	15480	106.7	884	393	-	-	765	340	724	322

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
5 1/2	139.7	H-40	14.0	20.8	2620	18.1	3110	21.4	3110	21.4	-	-	161	72	130	58	-	-	-	-
		J-55	14.0	20.8	3120	21.5	4270	29.4	4270	29.4	-	-	222	99	172	77	-	-	-	-
		J-55	15.5	23.1	4040	27.9	4810	33.2	4810	33.2	4810	33.2	248	110	202	90	217	97	300	133
		J-55	17.0	25.3	4910	33.9	5320	36.7	5320	36.7	5320	36.7	273	121	229	102	247	110	329	146
		J-55	20.0	29.8	6620	45.6	6320	43.6	6320	43.6	6320	43.6	321	143	282	125	304	135	387	172
		J-55	23.0	34.2	7670	52.9	7260	50.1	6440	44.4	6790	46.8	365	162	331	147	356	158	435	193
		J-55	26.0	38.7	8700	60.0	8330	57.4	-	-	-	-	413	184	385	171	415	185	-	-
		J-55	32.3	48.1	10880	75.0	10710	73.8	-	-	-	-	517	230	-	-	539	240	-	-
		J-55	36.4	54.2	12290	84.7	12340	85.1	-	-	-	-	584	260	-	-	619	275	-	-
		M-65	14.0	20.8	3360	23.2	5050	34.8	5050	34.8	-	-	262	117	200	89	-	-	-	-
		M-65	15.5	23.1	4470	30.8	5690	39.2	5690	39.2	5690	39.2	293	130	235	105	253	113	342	152
		M-65	17.0	25.3	5500	37.9	6290	43.4	6290	43.4	6290	43.4	323	144	-	-	287	128	376	167
		M-65	20.0	29.8	7540	52.0	7470	51.5	7470	51.5	7470	51.5	379	169	-	-	353	157	442	197
		M-65	23.0	34.2	9070	62.5	8580	59.2	8580	59.2	8580	59.2	431	192	-	-	415	185	502	223

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
5 1/2	139.7	C-75	14.0	20.8	3540	24.4	5820	40.1	5820	40.1	5820	40.1	302	134	228	101	246	109	343	153
		C-75	15.5	23.1	4830	33.3	6560	45.2	6560	45.2	6560	45.2	339	151	268	119	288	128	385	171
		C-75	17.0	25.3	6040	41.6	7250	50.0	7250	50.0	7250	50.0	372	165	-	-	327	145	423	188
		C-75	20.0	29.8	8410	58.0	8610	59.4	8610	59.4	8430	58.1	437	194	-	-	403	179	497	221
		C-75	23.0	34.2	10470	72.2	9900	68.3	9260	63.8	8430	58.1	497	221	-	-	473	210	550	245
		C-75	26.0	38.7	11860	81.8	11360	78.3	-	-	-	-	563	250	511	227	550	245	-	-
		C-75	32.3	48.1	14830	102.2	14600	100.7	-	-	-	-	705	314	-	-	715	318	-	-
		C-75	36.4	54.2	16760	115.6	16820	116.0	-	-	-	-	797	355	-	-	822	366	-	-
		L-80	14.0	20.8	3620	25.0	6210	42.8	6210	42.8	6210	42.8	322	143	238	106	254	113	347	154
		L-80	15.5	23.1	4990	34.4	7000	48.3	7000	48.3	7000	48.3	361	161	279	124	298	133	389	173
		L-80	17.0	25.3	6290	43.4	7740	53.4	7740	53.4	7740	53.4	397	177	-	-	338	150	428	190
		L-80	20.0	29.8	8830	60.9	9190	63.4	9190	63.4	8990	62.0	466	207	-	-	416	185	503	224
		L-80	23.0	34.2	11160	76.9	10560	72.8	9880	68.1	8990	62.0	530	236	-	-	488	217	550	245
		L-80	26.0	38.7	12650	87.2	12120	-	-	-	-	-	601	267	533	237	568	253	-	-
		L-80	32.3	48.1	15820	109.1	15580	-	-	-	-	-	752	335	-	-	738	328	-	-
		L-80	36.4	54.2	17880	123.3	17950	-	-	-	-	-	850	378	-	-	849	378	-	-

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
5 1/2	139.7	C-90	17.0	25.3	6740	46.5	8710	60.1	8710	60.1	8710	60.1	447	199	-	-	355	158	456	203
		C-90	20.0	29.8	9630	66.4	10340	71.3	10340	71.3	10120	69.8	525	234	-	-	438	195	536	238
		C-90	23.0	34.2	12380	85.4	11880	81.9	11110	76.6	10120	69.8	597	266	-	-	514	229	579	258
		C-90	26.0	38.7	14240	98.2	13630	94.0	11110	76.6	10120	69.8	676	301	-	-	598	266	580	258
		C-90	26.8	39.9	14880	102.6	14320	98.7	-	-	-	-	707	314	-	-	-	-	-	-
		C-90	29.7	44.2	16510	113.8	16090	110.9	-	-	-	-	785	349	-	-	-	-	-	-
		C-90	32.6	48.5	18130	125.0	17900	123.4	-	-	-	-	861	383	-	-	-	-	-	-
		C-90	35.0	52.1	18760	129.3	18610	128.3	11110	76.6	10120	69.8	891	396	-	-	614	273	580	258
		C-90	35.3	52.5	19680	135.7	19670	135.6	-	-	-	-	935	416	-	-	-	-	-	-
		C-90	38.0	56.6	21200	146.2	21480	148.1	-	-	-	-	1007	448	-	-	-	-	-	-
		C-90	40.5	60.3	22650	156.2	23250	160.3	-	-	-	-	1076	479	-	-	-	-	-	-
		C-90	43.1	64.1	24080	166.0	25060	172.8	-	-	-	-	1144	509	-	-	-	-	-	-
		C-95	17.0	25.3	6940	47.8	9190	63.4	9190	63.4	9190	63.4	471	210	-	-	373	-	480	214
		C-95	20.0	29.8	10020	69.1	10910	75.2	10910	75.2	10680	73.6	554	246	-	-	460	-	563	250
		C-95	23.0	34.2	12930	89.1	12540	86.5	11730	80.9	10680	73.6	630	280	-	-	540	-	608	270

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
5 1/2	139.7	P-110	14.0	20.8	4230	29.2	8540	58.9	8540	58.9	8540	58.9	443	197	323	144	334	149	461	205
		P-110	15.5	23.1	5630	38.8	9630	66.4	9630	66.4	9630	66.4	497	221	379	169	392	174	517	230
		P-110	17.0	25.3	7480	51.6	10640	73.4	10640	73.4	10640	73.4	546	243	-	-	444	198	568	253
		P-110	20.0	29.8	11100	76.5	12640	87.1	12640	87.1	12360	85.2	641	285	-	-	547	243	667	297
		P-110	23.0	34.2	14540	100.2	14530	100.2	13580	93.6	12360	85.2	729	324	-	-	642	286	724	322
		P-110	26.0	38.7	17390	119.9	16660	114.9	-	-	-	-	826	367	723	322	748	333	-	-
		P-110	32.3	48.1	21760	150.0	21420	147.7	-	-	-	-	1034	460	-	-	972	432	-	-
		P-110	36.4	54.2	24590	169.5	24680	170.2	-	-	-	-	1168	520	-	-	1117	497	-	-
		Q125	23.0	34.2	16060	110.7	16510	113.8	15430	106.4	14050	96.9	829	369	-	-	694	309	782	348
6 5/8	168.3	H-40	20.0	29.8	2520	17.4	3040	21.0	3040	21.0	-	-	229	102	184	82	-	-	-	-
		J-55	20.0	29.8	2970	20.5	4180	28.8	4180	28.8	4180	28.8	315	140	245	109	266	118	374	166
		J-55	24.0	35.7	4560	31.4	5110	35.2	5110	35.2	5110	35.2	382	170	314	140	340	151	453	202
		J-55	28.0	41.7	6170	42.5	6060	41.8	6060	41.8	6060	41.8	447		382	170	415	185	531	236
		J-55	32.0	47.6	7320	50.5	6900	47.6	6900	47.6	6900	47.6	505		442	197	480	214	599	266
		M-65	20.0	29.8	3190	22.0	4940	34.1	4940	34.1	4940	34.1	373	166	285	127	309	137	428	190
		M-65	24.0	35.7	5080	35.0	6040	41.6	6040	41.6	6040	41.6	451	201	-	-	396	176	518	230
		M-65	28.0	41.7	7010	48.3	7160	49.4	7160	49.4	7160	49.4	529	235	-	-	483	215	607	270

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
6 5/8	168.3	C-75	20.0	29.8	3350	23.1	5710	39.4	5710	39.4	5710	39.4	430	191	326	145	353	157	482	214
		C-75	24.0	35.7	5550	38.3	6970	48.1	6970	48.1	6970	48.1	520	231	-	-	453	202	583	259
		C-75	28.0	41.7	7790	53.7	8260	57.0	8260	57.0	8260	57.0	610	271	-	-	552	246	683	304
		C-75	32.0	47.6	9800	67.6	9410	64.9	9410	64.9	9200	63.4	688	306	-	-	638	284	771	343
		L-80	20.0	29.8	3470	23.9	6090	42.0	6090	42.0	6090	42.0	459	204	340	151	369	164	489	218
		L-80	24.0	35.7	5760	39.7	7440	51.3	7440	51.3	7440	51.3	555	247	-	-	473	210	591	263
		L-80	28.0	41.7	8170	56.3	8810	60.7	8810	60.7	8810	60.7	651	290	-	-	576	256	693	308
		L-80	32.0	47.6	10320	71.2	10040	69.2	10040	69.2	9820	67.7	734	326	-	-	666	296	783	348
		C-90	24.0	35.7	6140	42.3	8370	57.7	8370	57.7	8370	57.7	624	278	-	-	519	231	633	282
		C-90	28.0	41.7	8880	61.2	9910	68.3	9910	68.3	9910	68.3	732	326	-	-	633	282	742	330
		C-90	32.0	47.6	11330	78.1	11290	77.8	11290	77.8	11050	76.2	826	367	-	-	732	326	837	372
		C-95	24.0	35.7	6310	43.5	8830	60.9	8830	60.9	8830	60.9	659	293	-	-	545	242	665	296
		C-95	28.0	41.7	9220	63.6	10460	72.1	10460	72.1	10460	72.1	773	344	-	-	664	295	780	347
		C-95	32.0	47.6	11820	81.5	11920	82.2	11920	82.2	11660	80.4	872	388	-	-	769	342	880	391
		P-110	20.0	29.8	4030	27.8	8370	57.7	8370	57.7	8370	57.7	631	281	461	205	500	222	650	289
		P-110	24.0	35.7	6730	46.4	10230	70.5	10230	70.5	10230	70.5	763	339	-	-	641	285	786	350
		P-110	28.0	41.7	10160	70.1	12120	83.6	12120	83.6	12120	83.6	895	398	-	-	781	347	922	410
		P-110	32.0	47.6	13220	91.1	13800	95.1	13800	95.1	13500	93.1	1010	449	-	-	904	402	1040	463
		Q125	32.0	47.6	14540	100.2	15680	108.1	15680	108.1	15340	105.8	1147	510	-	-	988	439	1138	506

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
7	177.8	H-40	17.0	25.3	1420	9.8	2310	15.9	2310	15.9	-	-	196	87	122	54	-	-	-	-
		H-40	20.0	29.8	1970	13.6	2720	18.8	2720	18.8	-	-	230	102	176	78	-	-	-	-
		J-55	20.0	29.8	2270	15.7	3740	25.8	3740	25.8	-	-	316	141	234	104	-	-	-	-
		J-55	23.0	34.2	3270	22.5	4360	30.1	4360	30.1	4360	30.1	366	163	284	126	313	139	432	192
		J-55	26.0	38.7	4330	29.9	4980	34.3	4980	34.3	4980	34.3	415	185	334	149	367	163	490	218
		J-55	29.0	43.2	5410	37.3	5610	38.7	5610	38.7	5610	38.7	465	207	384	171	423	188	548	244
		J-55	32.0	47.6	6460	44.5	6230	43.0	5960	41.1	5820	40.1	512	228	432	192	476	212	605	269
		J-55	35.0	52.1	7270	50.1	6850	47.2	5960	41.1	5820	40.1	559	249	480	214	528	235	657	292
		J-55	38.0	56.6	7830	54.0	7430	51.2	5960	41.1	5820	40.1	603	268	524	233	576	256	657	292
		J-55	41.0	61.0	8490	58.5	8110	55.9	-	-	-	-	653	290	-	-	633	282	-	-
		J-55	44.0	65.5	9140	63.0	8800	60.7	-	-	-	-	703	313	-	-	688	306	-	-
		J-55	49.5	73.7	10280	70.9	10040	69.2	-	-	-	-	791	352	-	-	786	350	-	-
		M-65	20.0	29.8	2480	17.1	4420	30.5	4420	30.5	-	-	374	166	272	121	-	-	-	-
		M-65	23.0	34.2	3540	24.4	5150	35.5	5150	35.5	5150	35.5	433	193	-	-	364	162	494	220
		M-65	26.0	38.7	4810	33.2	5880	40.5	5880	40.5	5880	40.5	491	218	-	-	428	190	561	250
		M-65	29.0	43.2	6100	42.1	6630	45.7	6630	45.7	6630	45.7	549	244	-	-	492	219	628	279
		M-65	32.0	47.6	7360	50.7	7360	50.7	7360	50.7	7360	50.7	606	270	-	-	554	246	692	308

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
7	177.8	C-75	20.0	29.8	2660	18.3	5100	35.2	5100	35.2	5100	35.2	431	192	311	138	342	152	481	214
		C-75	23.0	34.2	3750	25.9	5940	41.0	5940	41.0	5940	41.0	499	222	-	-	416	185	557	248
		C-75	26.0	38.7	5220	36.0	6790	46.8	6790	46.8	6790	46.8	566	252	-	-	489	218	631	281
		C-75	29.0	43.2	6730	46.4	7650	52.7	7650	52.7	7650	52.7	634	282	-	-	562	250	707	314
		C-75	32.0	47.6	8200	56.5	8490	58.5	8490	58.5	7930	54.7	699	311	-	-	633	282	779	347
		C-75	35.0	52.1	9670	66.7	9340	64.4	8660	59.7	7930	54.7	763	339	-	-	703	313	833	371
		C-75	38.0	56.6	10680	73.6	10120	69.8	8660	59.7	7930	54.7	822	366	-	-	767	341	833	371
		C-75	41.0	61.0	11580	79.8	11060	76.3	-	-	-	-	891	396	-	-	842	375	-	-
		C-75	44.0	65.5	12460	85.9	12000	82.7	-	-	-	-	959	427	-	-	916	407	-	-
		C-75	49.5	73.7	14010	96.6	13690	94.4	-	-	-	-	1078	480	-	-	1045	465	-	-
		L-80	20.0	29.8	2740	18.9	5440	37.5	5400	37.2	5440	37.5	460	205	325	145	357	159	488	217
		L-80	23.0	34.2	3830	26.4	6340	43.7	6340	43.7	6340	43.7	532	237	-	-	435	193	565	251
		L-80	26.0	38.7	5410	37.3	7240	49.9	7240	49.9	7240	49.9	604	269	-	-	511	227	641	285
		L-80	29.0	43.2	7030	48.5	8160	56.3	8160	56.3	8160	56.3	676	301	-	-	587	261	718	319
		L-80	32.0	47.6	8600	59.3	9060	62.5	9060	62.5	8460	58.3	745	331	-	-	661	294	791	352
		L-80	35.0	52.1	10180	70.2	9960	68.7	9240	63.7	8460	58.3	814	362	-	-	734	326	832	370
		L-80	38.0	56.6	11390	78.5	10800	74.5	9240	63.7	8460	58.3	877	390	-	-	801	356	832	370
		L-80	41.0	61.0	12350	85.2	11800	81.4	-	-	-	-	950	423	-	-	880	-	-	-
		L-80	44.0	65.5	13290	91.6	12800	88.3	-	-	-	-	1023	455	-	-	957	-	-	-
		L-80	49.5	73.7	14950	103.1	14600	100.7	-	-	-	-	1150	512	-	-	1092	-	-	-

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
7	177.8	C-90	23.0	34.2	4030	27.8	7130	49.2	7130	49.2	7130	49.2	599	266	-	-	479	213	605	269
		C-90	26.0	38.7	5740	39.6	8140	56.1	8140	56.1	8140	56.1	679	302	-	-	563	250	687	306
		C-90	29.0	43.2	7580	52.3	9180	63.3	9180	63.3	9180	63.3	760	338	-	-	648	288	768	342
		C-90	32.0	47.6	9380	64.7	10190	70.3	10190	70.3	9520	65.6	839	373	-	-	729	324	847	377
		C-90	35.0	52.1	11170	77.0	11210	77.3	10390	71.6	9520	65.6	915	407	-	-	809	360	876	390
		C-90	38.0	56.6	12810	88.3	12150	83.8	10390	71.6	9520	65.6	986	439	-	-	883	393	876	390
		C-90	42.7	63.5	14640	100.9	14060	96.9	-	-	-	-	1127	501	-	-	-	-	-	-
		C-90	46.4	69.1	15930	109.8	15460	106.6	-	-	-	-	1226	545	-	-	-	-	-	-
		C-90	50.1	74.6	17220	118.7	16880	116.4	-	-	-	-	1325	589	-	-	-	-	-	-
		C-90	53.6	79.8	18460	127.3	18270	126.0	-	-	-	-	1421	632	-	-	-	-	-	-
		C-90	57.1	85.0	19690	135.8	19690	135.8	-	-	-	-	1515	674	-	-	-	-	-	-
		C-95	23.0	34.2	4140	28.5	7530	51.9	7530	51.9	7530	51.9	632	281	-	-	505	225	636	283
		C-95	26.0	38.7	5890	40.6	8600	59.3	8600	59.3	8600	59.3	717	319	-	-	593	264	722	321
		C-95	29.0	43.2	7840	54.1	9690	66.8	9690	66.8	9690	66.8	803	357	-	-	683	304	808	359
		C-95	32.0	47.6	9740	67.2	10760	74.2	10760	74.2	10050	69.3	885	394	-	-	768	342	891	396
		C-95	35.0	52.1	11650	80.3	11830	81.6	10970	75.6	10050	69.3	966	430	-	-	853	379	920	409
		C-95	38.0	56.6	13430	92.6	12830	88.5	10970	75.6	10050	69.3	1041	463	-	-	931	414	920	409

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
7	177.8	P-110	20.0	29.8	2980	20.5	7480	51.6	7480	51.6	7480	51.6	632	281	442	197	485	216	650	289
		P-110	23.0	34.2	4440	30.6	8720	60.1	8720	60.1	8720	60.1	732	326	537	239	590	262	752	335
		P-110	26.0	38.7	6230	43.0	9960	68.7	9960	68.7	9960	68.7	830	369	-	-	693	308	853	379
		P-110	29.0	43.2	8530	58.8	11220	77.4	11220	77.4	11220	77.4	929	413	-	-	797	355	955	425
		P-110	32.0	47.6	10780	74.3	12460	85.9	12460	85.9	11640	80.3	1025	456	-	-	897	399	1053	468
		P-110	35.0	52.1	13030	89.8	13700	94.5	12700	87.6	11640	80.3	1119	498	-	-	996	443	1095	487
		P-110	38.0	56.6	15130	104.3	14850	102.4	12700	87.6	11640	80.3	1206	536	-	-	1087	484	1095	487
		P-110	41.0	61.0	16980	117.1	16230	111.9	-	-	-	-	1307	581	-	-	1193	531	-	-
		P-110	44.0	65.5	18280	126.0	17600	121.3	-	-	-	-	1407	626	-	-	1298	577	-	-
		P-110	49.5	73.7	20550	141.7	20080	138.4	-	-	-	-	1582	704	-	-	1482	659	-	-
		Q125	35.0	52.1	14310	98.7	15560	107.3	14430	99.5	13220	91.1	1272	566	-	-	1105	492	1183	526
		Q125	38.0	56.6	16740	115.4	16880	116.4	14430	99.5	13220	91.1	1370	609	-	-	1206	536	1183	526
7 5/8	193.7	H-40	24.0	35.7	2030	14.0	2750	19.0	2750	19.0	-	-	276	123	212	94	-	-	-	-
		J-55	26.4	39.3	2900	20.0	4140	28.5	4140	28.5	4140	28.5	414	184	315	140	346	154	483	215
		J-55	29.7	44.2	3910	27.0	4730	32.6	4730	32.6	4730	32.6	470	209	370	165	407	181	549	244
		J-55	33.7	50.2	5100	35.2	5430	37.4	5430	37.4	5430	37.4	535	238	434	193	477	212	625	278
		J-55	39.0	58.0	6610	45.6	6310	43.5	6310	43.5	6310	43.5	616	274	514	229	564	251	720	320
		J-55	45.3	67.4	7910	54.5	7510	51.8	6860	47.3	6730	46.4	723	322	619	275	680	302	845	376

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
7 5/8	193.7	M-65	26.4	39.3	3100	21.4	4890	33.7	4890	33.7	4890	33.7	489	218	368	164	403	179	554	246
		M-65	29.7	44.2	4310	29.7	5590	38.5	5590	38.5	5590	38.5	555	247	-	-	474	211	629	280
		M-65	33.7	50.2	5720	39.4	6410	44.2	6410	44.2	6410	44.2	632	281	-	-	556	247	716	318
		C-75	26.4	39.3	3280	22.6	5650	39.0	5650	39.0	5650	39.0	564	251	-	-	461	205	624	278
		C-75	29.7	44.2	4650	32.1	6450	44.5	6450	44.5	6450	44.5	641	285	-	-	542	241	709	315
		C-75	33.7	50.2	6300	43.4	7400	51.0	7400	51.0	7400	51.0	729	324	-	-	635	282	806	359
		C-75	39.0	58.0	8400	57.9	8610	59.4	8610	59.4	8610	59.4	839	373	-	-	751	334	929	413
		C-75	42.8	63.7	10240	70.6	9670	66.7	9670	66.7	9190	63.4	935	416	-	-	852	379	1035	460
		C-75	45.3	67.4	10790	74.4	10240	70.6	9840	67.8	9180	63.3	986	439	-	-	905	403	1090	485
		C-75	47.1	70.1	11290	77.8	10760	74.2	9840	67.8	9190	63.4	1031	459	-	-	953	424	1140	507
		L-80	26.4	39.3	3400	23.4	6020	41.5	6020	41.5	6020	41.5	602	268	-	-	482	214	635	282
		L-80	29.7	44.2	4790	33.0	6890	47.5	6890	47.5	6890	47.5	683	304	-	-	566	252	721	321
		L-80	33.7	50.2	6560	45.2	7900	54.5	7900	54.5	7900	54.5	778	346	-	-	664	295	820	365
		L-80	39.0	58.0	8820	60.8	9180	63.3	9180	63.3	9180	63.3	895	398	-	-	786	350	945	420
		L-80	42.8	63.7	10810	74.5	10320	71.2	10320	71.2	9790	67.5	998	444	-	-	891	396	1053	468
		L-80	45.3	67.4	11510	79.4	10920	75.3	10490	72.3	9790	67.5	1051	468	-	-	947	421	1109	493
		L-80	47.1	70.1	12040	83.0	11480	79.2	10490	72.3	9790	67.5	1100	489	-	-	997	443	1160	516

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
7 5/8	193.7	C-90	26.4	39.3	3610	24.9	6780	46.7	6780	46.7	6780	46.7	677	301	-	-	532	237	681	303
		C-90	29.7	44.2	5030	34.7	7750	53.4	7750	53.4	7750	53.4	769	342	-	-	625	278	773	344
		C-90	33.7	50.2	7050	48.6	8880	61.2	8880	61.2	8880	61.2	875	389	-	-	733	326	880	391
		C-90	39.0	58.0	9620	66.3	10330	71.2	10330	71.2	10330	71.2	1007	448	-	-	867	386	1013	451
		C-90	42.8	63.7	11890	82.0	11610	80.0	11610	80.0	11010	75.9	1122	499	-	-	983	437	1129	502
		C-90	45.3	67.4	12950	89.3	12290	84.7	11810	81.4	11010	75.9	1183	526	-	-	1045	465	1189	529
		C-90	47.1	70.1	13540	93.4	12910	89.0	11810	81.4	11010	75.9	1237	550	-	-	1100	489	1238	551
		C-90	51.2	76.2	14760	101.8	14190	97.8	-	-	-	-	1348	600	-	-	-	-	-	-
		C-90	55.3	82.3	15960	110.0	15490	106.8	-	-	-	-	1458	649	-	-	-	-	-	-
		C-95	26.4	39.3	3710	25.6	7150	49.3	7150	49.3	7150	49.3	714	318	-	-	560	249	716	318
		C-95	29.7	44.2	5130	35.4	8180	56.4	8180	56.4	8180	56.4	811	361	-	-	659	293	813	362
		C-95	33.7	50.2	7280	50.2	9380	64.7	9380	64.7	9380	64.7	923	411	-	-	772	343	925	411
		C-95	39.0	58.0	10000	68.9	10900	75.2	10900	75.2	10900	75.2	1063	473	-	-	914	407	1065	474
		C-95	42.8	63.7	12410	85.6	12250	84.5	12250	84.5	11620	80.1	1185	527	-	-	1037	461	1187	528
		C-95	45.3	67.4	13670	94.3	12970	89.4	12460	85.9	11620	80.1	1248	555	-	-	1101	490	1251	556
		C-95	47.1	70.1	14300	98.6	13630	94.0	12460	85.9	11620	80.1	1306	581	-	-	1159	516	1300	578

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
7 5/8	193.7	P-110	26.4	39.3	3920	27.0	8280	57.1	8280	57.1	8280	57.1	827	368	597	266	654	291	845	376
		P-110	29.7	44.2	5350	36.9	9470	65.3	9470	65.3	9470	65.3	940	418	-	-	769	342	960	427
		P-110	33.7	50.2	7870	54.3	10860	74.9	10860	74.9	10860	74.9	1069	476	-	-	901	401	1093	486
		P-110	39.0	58.0	11080	76.4	12620	87.0	12620	87.0	12620	87.0	1231	548	-	-	1066	474	1258	560
		P-110	42.8	63.7	13930	96.0	14190	97.8	14190	97.8	13460	92.8	1372	610	-	-	1210	538	1402	624
		P-110	45.3	67.4	15440	106.5	15020	103.6	14430	99.5	13460	92.8	1445	643	-	-	1285	572	1477	657
		P-110	47.1	70.1	16550	114.1	15780	108.8	14430	99.5	13460	92.8	1512	673	-	-	1353	602	1545	687
		Q125	39.0	58.0	12060	83.2	14340	98.9	14340	98.9	14340	98.9	1399	622	-	-	1194	531	1379	613
		Q125	42.8	63.7	15350	105.8	16120	111.1	16120	111.1	15290	105.4	1559	693	-	-	1355	603	1536	683
		Q125	45.3	67.4	17100	117.9	17070	117.7	16400	113.1	15290	105.4	1643	731	-	-	1439	640	1619	720
		Q125	47.1	70.1	18700	128.9	17930	123.6	16400	113.1	15290	105.4	1718	764	-	-	1515	674	1671	743
7 3/4	196.9	J-55	46.1	68.6	7800	53.8	7390	51.0	-	-	-	-	736	327	-	-	-	-	-	-
		C-75	46.1	68.6	10630	73.3	10080	69.5	-	-	-	-	1003	446	-	-	-	-	-	-
		L-80	46.1	68.6	11340	78.2	10750	74.1	-	-	-	-	1070	476	-	-	-	-	-	-
		C-90	46.1	68.6	12750	87.9	12090	83.4	-	-	-	-	1204	536	-	-	-	-	-	-
		C-95	46.1	68.6	13320	91.8	12760	88.0	-	-	-	-	1271	565	-	-	-	-	-	-
		P-110	46.1	68.6	15000	103.4	14780	101.9	-	-	-	-	1471	654	-	-	-	-	-	-
		Q125	46.1	68.6	16590	114.4	16790	115.8	-	-	-	-	1672	744	-	-	-	-		-

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
8 5/8	219.1	H-40	28.0	41.7	1610	11.1	2470	17.0	2470	17.0	-	-	318	141	233	104	-	-	-	-
		H-40	32.0	47.6	2200	15.2	2860	19.7	2860	19.7	-	-	366	163	279	124	-	-	-	-
		J-55	24.0	35.7	1370	9.4	2950	20.3	2950	20.3	2950	20.3	381	169	244	109	290	129	439	195
		J-55	28.0	41.7	1880	13.0	3390	23.4	3390	23.4	3390	23.4	437	194	311	138	348	155	503	224
		J-55	32.0	47.6	2530	17.4	3930	27.1	3930	27.1	3930	27.1	503	224	372	165	417	185	579	258
		J-55	36.0	53.6	3450	23.8	4460	30.8	4460	30.8	4460	30.8	568	253	434	193	486	216	654	291
		J-55	40.0	59.5	4400	30.3	5020	34.6	5020	34.6	5020	34.6	636	283	496	221	556	247	732	326
		J-55	44.0	65.5	5360	37.0	5580	38.5	5580	38.5	5580	38.5	702	312	558	248	626	278	808	359
		J-55	49.0	72.9	6440	44.4	6220	42.9	6220	42.9	6220	42.9	776	345	628	279	704	313	894	398
		J-55	52.0	77.4	7060	48.7	6640	45.8	6640	45.8	6640	45.8	826	367	-	-	756	336	950	423
		M-65	24.0	35.7	1420	9.8	3480	24.0	3480	24.0	-	-	451	201	285	127	-	-	-	-
		M-65	28.0	41.7	2020	13.9	4010	27.6	4010	27.6	-	-	517	230	362	161	-	-	-	-
		M-65	32.0	47.6	2740	18.9	4640	32.0	4640	32.0	4640	32.0	595	265	435	193	487	217	664	295
		M-65	36.0	53.6	3760	25.9	5280	36.4	5280	36.4	5280	36.4	672	299	506	225	567	252	751	334
		M-65	40.0	59.5	4900	33.8	5930	40.9	5930	40.9	5930	40.9	751	334	-	-	649	289	839	373

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
8 5/8	219.1	C-75	28.0	41.7	2120	14.6	4630	31.9	4630	31.9	4630	31.9	596	265	414	184	464	206	651	290
		C-75	32.0	47.6	2950	20.3	5360	37.0	5360	37.0	5360	37.0	686	305	497	221	556	247	749	333
		C-75	36.0	53.6	4000	27.6	6090	42.0	6090	42.0	6090	42.0	775	345	-	-	648	288	847	377
		C-75	40.0	59.5	5330	36.7	6850	47.2	6850	47.2	6850	47.2	867	386	-	-	742	330	947	421
		C-75	44.0	65.5	6660	45.9	7610	52.5	7610	52.5	7610	52.5	957	426	-	-	834	371	1046	465
		C-75	49.0	72.9	8180	56.4	8480	58.5	8480	58.5	8480	58.5	1059	471	-	-	939	418	1157	515
		C-75	52.0	77.4	9180	63.3	9050	62.4	9050	62.4	9050	62.4	1126	501	-		1007	448	1230	547
		L-80	28.0	41.7	2160	14.9	4930	34.0	4930	34.0	4930	34.0	636	283	434	193	486	216	664	295
		L-80	32.0	47.6	3050	21.0	5710	39.4	5710	39.4	5710	39.4	732	326	521	232	583	259	764	340
		L-80	36.0	53.6	4100	28.3	6490	44.7	6490	44.7	6490	44.7	827	368	-	-	678	302	863	384
		L-80	40.0	59.5	5520	38.1	7300	50.3	7300	50.3	7300	50.3	925	411	-	-	776	345	966	430
		L-80	44.0	65.5	6950	47.9	8120	56.0	8120	56.0	8120	56.0	1021	454	-	-	874	389	1066	474
		L-80	49.0	72.9	8570	59.1	9040	62.3	9040	62.3	9040	62.3	1129	502	-	-	983	437	1179	524
		L-80	52.0	77.4	9650	66.5	9660	66.6	9660	66.6	9660	66.6	1201	534	-	-	1055	469	1254	558
		C-90	36.0	53.6	4250	29.3	7300	50.3	7300	50.3	7300	50.3	930	414	-	-	749	333	928	413
		C-90	40.0	59.5	5870	40.5	8220	56.7	8220	56.7	8220	56.7	1040	463	-	-	858	382	1038	462
		C-90	44.0	65.5	7490	51.6	9130	62.9	9130	62.9	9130	62.9	1149	511	-	-	965	429	1146	510
		C-90	49.0	72.9	9340	64.4	10170	70.1	10170	70.1	10170	70.1	1271	565	-	-	1085	483	1268	564

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd		Yield Stength		Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
8 5/8	219.1	C-95	36.0	53.6	4350	30.0	7710	53.2	7710	53.2	7710	53.2	982	437	-	-	789	351	976	434
		C-95	40.0	59.5	6020	41.5	8670	59.8	8670	59.8	8670	59.8	1098	488	-	-	904	402	1092	486
		C-95	44.0	65.5	7740	53.4	9640	66.5	9640	66.5	9640	66.5	1212	539	-	-	1017	452	1206	536
		C-95	49.0	72.9	9700	66.9	10740	74.0	10740	74.0	10740	74.0	1341	597	-	-	1144	509	1334	593
		P-110	28.0	41.7	2210	15.2	6780	46.7	6780	46.7	6780	46.7	874	389	590	262	660	294	886	394
		P-110	32.0	47.6	3420	23.6	7860	54.2	7860	54.2	7860	54.2	1006	447	707	314	791	352	1020	454
		P-110	36.0	53.6	4690	32.3	8930	61.6	8930	61.6	8930	61.6	1137	506	823	366	921	410	1152	512
		P-110	40.0	59.5	6390	44.1	10040	69.2	10040	69.2	10040	69.2	1271	565	-	-	1055	469	1288	573
		P-110	44.0	65.5	8420	58.1	11160	76.9	11160	76.9	11160	76.9	1404	625	-	-	1186	528	1423	633
		P-110	49.0	72.9	10730	74.0	12430	85.7	12430	85.7	12430	85.7	1553	691	-	-	1335	594	1574	700
		P-110	52.0	77.4	12280	84.7	13280	91.6	13280	91.6	13280	91.6	1651	734	-	-	1432	637	16730	7442
		Q125	49.0	72.9	11660	80.4	14130	97.4	14130	97.4	14130	97.4	1765	785	-	-	1496	665	1728	769
9 5/8	244.5	H-40	32.3	48.1	1370	9.4	2270	15.7	2270	15.7	-	-	365	162	254	113	-	-	-	-
		H-40	36.0	53.6	1720	11.9	2560	17.7	2560	17.7	-	-	410	182	294	131	-	-	-	-
		J-55	36.0	53.6	2020	13.9	3520	24.3	3520	24.3	3520	24.3	564	251	394	175	453	202	639	284
		J-55	40.0	59.5	2570	17.7	3950	27.2	3950	27.2	3950	27.2	630	280	452	201	520	231	714	318
		J-55	43.5	64.7	3250	22.4	4350	30.0	4350	30.0	4350	30.0	691	307	505	225	582	259	783	348
		J-55	47.0	69.9	3890	26.8	4720	32.5	4720	32.5	4720	32.5	746	332	554	246	638	284	846	376
		J-55	53.5	79.6	5130	35.4	5450	37.6	5450	37.6	5450	37.6	855	380	650	289	748	333	969	431
		J-55	58.4	86.9	5990	41.3	5950	41.0	5950	41.0	5950	41.0	928	413	-	-	823	366	1052	468

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
9 5/8	244.5	M-65	36.0	53.6	2190	15.1	4160	28.7	4160	28.7	4160	28.7	667	297	460	205	529	235	734	326
		M-65	40.0	59.5	2770	19.1	4670	32.2	4670	32.2	4670	32.2	744	331	528	235	607	270	820	365
		M-65	43.5	64.7	3530	24.3	5140	35.4	5140	35.4	5140	35.4	816	363	-	-	679	302	899	400
		M-65	47.0	69.9	4280	29.5	5580	38.5	5580	38.5	5580	38.5	882	392	-	-	745	331	972	432
		C-75	36.0	53.6	2320	16.0	4800	33.1	4800	33.1	4800	33.1	769	342	526	234	605	269	829	369
		C-75	40.0	59.5	2990	20.6	5390	37.2	5390	37.2	5390	37.2	859	382	-	-	694	309	926	412
		C-75	43.5	64.7	3730	25.7	5930	40.9	5930	40.9	5930	40.9	942	419	-	-	776	345	1016	452
		C-75	47.0	69.9	4610	31.8	6440	44.4	6440	44.4	6440	44.4	1018	453	-	-	852	379	1098	488
		C-75	53.5	79.6	6350	43.8	7430	51.2	7430	51.2	7430	51.2	1166	519	-	-	999	444	1257	559
		C-75	58.4	86.9	7540	52.0	8110	55.9	8110	55.9	8110	55.9	1266	563	-	-	1098	488	1365	607
		L-80	36.0	53.6	2370	16.3	5120	35.3	5120	35.3	5120	35.3	820	365	551	245	634	282	848	377
		L-80	40.0	59.5	3090	21.3	5750	39.6	5750	39.6	5750	39.6	916	407	-	-	727	323	947	421
		L-80	43.5	64.7	3810	26.3	6330	43.6	6330	43.6	6330	43.6	1005	447	-	-	813	362	1038	462
		L-80	47.0	69.9	4750	32.8	6870	47.4	6870	47.4	6870	47.4	1086	483	-	-	893	397	1122	499
		L-80	53.5	79.6	6620	45.6	7930	54.7	7930	54.7	7930	54.7	1244	553	-	-	1047	466	1285	572
		L-80	58.4	86.9	7890	54.4	8650	59.6	8650	59.6	8650	59.6	1350	601	-	-	1151	512	1396	621

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
9 5/8	244.5	C-90	40.0	59.5	3260	22.5	6460	44.5	6460	44.5	6460	44.5	1031	459	-	-	804	358	1021	454
		C-90	43.5	64.7	4010	27.6	7120	49.1	7120	49.1	7120	49.1	1130	503	-	-	899	400	1119	498
		C-90	47.0	69.9	4990	34.4	7720	53.2	7720	53.2	7720	53.2	1222	544	-	-	987	439	1210	538
		C-90	53.5	79.6	7110	49.0	8920	61.5	8920	61.5	8920	61.5	1399	622	-	-	1157	515	1386	617
		C-90	58.4	86.9	8570	59.1	9740	67.2	9740	67.2	9740	67.2	1519	676	-	-	1272	566	1504	669
		C-90	59.4	88.4	8970	61.8	9970	68.7	-	-	-	-	1552	690	-	-	-	-	-	-
		C-90	64.9	96.6	10800	74.5	11000	75.8	-	-	-	-	1701	757	-	-	-	-	-	-
		C-90	70.3	104.6	12600	86.9	12010	82.8	-	-	-	-	1845	821	-	-	-	-	-	-
		C-90	75.6	112.5	13670	94.3	13040	89.9	-	-	-	-	1989	885	-	-	-	-	-	-
		C-95	40.0	59.5	3330	23.0	6820	47.0	6820	47.0	6820	47.0	1088	484	-	-	847	377	1074	478
		C-95	43.5	64.7	4130	28.5	7510	51.8	7510	51.8	7510	51.8	1193	531	-	-	948	422	1178	524
		C-95	47.0	69.9	5090	35.1	8150	56.2	8150	56.2	8150	56.2	1289	573	-	-	1040	463	1273	566
		C-95	53.5	79.6	7340	50.6	9410	64.9	9410	64.9	9410	64.9	1477	657	-	-	1220	543	1458	649
		C-95	58.4	86.9	8890	61.3	10280	70.9	10280	70.9	10280	70.9	1604	713	-	-	1341	597	1583	704

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
9 5/8	244.5	P-110	36.0	53.6	2470	17.0	7040	48.5	7040	48.5	7040	48.5	1128	502	749	333	861	383	1133	504
		P-110	40.0	59.5	3470	23.9	7900	54.5	7900	54.5	7900	54.5	1260	560	860	383	988	439	1266	563
		P-110	43.5	64.7	4420	30.5	8700	60.0	8700	60.0	8700	60.0	1381	614	-	-	1105	492	1388	617
		P-110	47.0	69.9	5300	36.5	9440	65.1	9440	65.1	9440	65.1	1493	664	-	-	1213	540	1500	667
		P-110	53.5	79.6	7950	54.8	10900	75.2	10900	75.2	10900	75.2	1710	761	-	-	1422	633	1718	764
		P-110	58.4	86.9	9770	67.4	11900	82.0	11900	82.0	11900	82.0	1857	826	-	-	1563	695	1865	830
		Q125	47.0	69.9	5630	38.8	10730	74.0	10730	74.0	10730	74.0	1697	755	-	-	1360	605	1650	734
		Q125	53.5	79.6	8440	58.2	12390	85.4	12390	85.4	12390	85.4	1943	864	-	-	1595	709	1890	841
		Q125	58.4	86.9	10540	72.7	13520	93.2	13520	93.2	13520	93.2	2110	939	-	-	1754	780	2052	913
9 7/8	250.8	J-55	62.8	93.5	6230	43.0	6090	42.0	-	-	-	-	990	440	-	-	-	-	-	-
		C-75	62.8	93.5	7880	54.3	8310	57.3	-	-	-	-	1362	606	-	-	-	-	-	-
		L-80	62.8	93.5	8260	57.0	8860	61.1	-	-	-	-	1453	646	-	-	-	-	-	-
		P-110	62.8	93.5	10280	70.9	12180	84.0	-	-	-	-	1998	889	-	-	-	-	-	-

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
10 3/4	273.1	H-40	32.8	48.7	840	5.8	1820	12.5	1820	12.5	-	-	367	163	205	91	-	-	-	-
		H-40	40.5	60.3	1390	9.6	2280	15.7	2280	15.7	-	-	457	203	314	140	-	-	-	-
		J-55	40.5	60.3	1580	10.9	3130	21.6	3130	21.6	3130	21.6	629	280	420	187	-	-	700	311
		J-55	45.5	67.7	2090	14.4	3580	24.7	3580	24.7	3580	24.7	715	318	493	219	-	-	796	354
		J-55	51.0	75.9	2710	18.7	4030	27.8	4030	27.8	4030	27.8	801	356	565	251	-	-	891	396
		J-55	55.5	82.6	3390	23.4	4430	30.5	-	-	4430	30.5	877	390	-	-	-	-	976	434
		J-55	60.7	90.3	4160	28.7	4880	33.6	4880	33.6	4880	33.6	961	427	700	311	-	-	1070	476
		J-55	65.7	97.8	4920	33.9	5330	36.7	5330	36.7	5330	36.7	1044	464	771	343	-	-	1162	517
		M-65	40.5	60.3	1670	11.5	3700	25.5	3700	25.5	3700	25.5	743	331	491	218	-	-	806	359
		M-65	45.5	67.7	2270	15.7	4230	29.2	4230	29.2	4230	29.2	845	376	576	256	-	-	916	407
		M-65	51.0	75.9	2870	19.8	4760	32.8	4760	32.8	4760	32.8	946	421	661	294	-	-	1026	456
		M-65	55.5	82.6	2870	19.8	4760	32.8	4760	32.8	4760	32.8	946	421	661	294	-	-	1026	456
		C-75	40.5	60.3	1720	11.9	4270	29.4	4270	29.4	4270	29.4	858	382	562	250	-	-	911	405
		C-75	45.5	67.7	2420	16.7	4880	33.6	4880	33.6	4880	33.6	975	434	659	293	-	-	1037	461
		C-75	51.0	75.9	3110	21.4	5490	37.9	5490	37.9	5490	37.9	1092	486	756	336	-	-	1160	516
		C-75	55.5	82.6	3920	27.0	6040	41.6	6040	41.6	6040	41.6	1196	532	843	375	-	-	1271	565
		C-75	60.7	90.3	4990	34.4	6650	45.9	6650	45.9	6650	45.9	1310	583	937	417	-	-	1392	619
		C-75	65.7	97.8	6060	41.8	7260	50.1	7260	50.1	7260	50.1	1424	633	1031	459	-	-	1531	681

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
10 3/4	273.1	L-80	40.5	60.3	1730	11.9	4560	31.4	4560	31.4	4560	31.4	915	407	590	262	-	-	934	415
		L-80	45.5	67.7	2470	17.0	5210	35.9	5210	35.9	5210	35.9	1040	463	692	308	-	-	1063	473
		L-80	51.0	75.9	3220	22.2	5860	40.4	5860	40.4	5860	40.4	1165	518	794	353	-	-	1190	529
		L-80	55.5	82.6	4020	27.7	6450	44.5	6450	44.5	6450	44.5	1276	568	884	393	-	-	1303	580
		L-80	60.7	90.3	5160	35.6	7100	49.0	7100	49.0	7100	49.0	1398	622	983	437	-	-	1428	635
		L-80	65.7	97.8	6300	43.4	7750	53.4	7750	53.4	7750	53.4	1519	676	10820	4813	-	-	1551	690
		C-90	51.0	75.9	3400	23.4	6590	45.4	6590	45.4	6590	45.4	1311	583	879	391	-	-	1287	572
		C-90	55.5	82.6	4160	28.7	7250	50.0	7250	50.0	7250	50.0	1435	638	979	435	-	-	1409	627
		C-90	60.7	90.3	5460	37.6	7980	55.0	7980	55.0	7980	55.0	1573	700	1089	484	-	-	1544	687
		C-90	65.7	97.8	6760	46.6	8720	60.1	8720	60.1	8720	60.1	1708	760	1198	533	-	-	1677	746
		C-90	73.2	108.9	8760	60.4	9850	67.9	-	-	-	-	1915	852	-	-	-	-	-	-
		C-90	79.2	117.9	10370	71.5	10750	74.1	-	-	-	-	2079	925	-	-	-	-	-	-
		C-90	85.3	126.9	12010	82.8	11680	80.5	-	-	-	-	2243	998	-	-	-	-	-	-
		C-95	51.0	75.9	3480	24.0	6960	48.0	6960	48.0	6960	48.0	1383	615	927	412	-	-	1354	602
		C-95	55.5	82.6	4290	29.6	7660	52.8	7660	52.8	7660	52.8	1515	674	1032	459	-	-	1483	660

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
10 3/4	273.1	P-110	40.5	60.3	1730	11.9	6270	43.2	6270	43.2	6270	43.2	1258	560	802	357	-	-	1251	556
		P-110	45.5	67.7	2610	18.0	7160	49.4	7160	49.4	7160	49.4	1431	637	941	419	-	-	1423	633
		P-110	51.0	75.9	3660	25.2	8060	55.6	8060	55.6	8060	55.6	1602	713	1079	480	-	-	1594	709
		P-110	55.5	82.6	4610	31.8	8860	61.1	8860	61.1	8860	61.1	1754	780	1202	535	-	-	1745	776
		P-110	60.7	90.3	5880	40.5	9760	67.3	9760	67.3	9760	67.3	1922	855	1337	595	-	-	1912	851
		P-110	65.7	97.8	7500	51.7	10650	73.4	10650	73.4	10650	73.4	2088	929	1471	654	-	-	2077	924
		Q125	60.7	90.3	6070	41.9	11090	76.5	11090	76.5	11090	76.5	2184	971	1502	668	-	-	2109	938
		Q125	65.7	97.8	7920	54.6	12110	83.5	12110	83.5	12110	83.5	2373	1056	1652	735	-	-	2291	1019
11 3/4	298.5	H-40	42.0	62.5	1040	7.2	1980	13.7	1980	13.7	-	-	478	213	307	137	-	-	-	-
		J-55	47.0	69.9	1510	10.4	3070	21.2	3070	21.2	3070	21.2	737	328	477	212	-	-	807	359
		J-55	54.0	80.4	2070	14.3	3560	24.5	3560	24.5	3560	24.5	850	378	568	253	-	-	931	414
		J-55	60.0	89.3	2660	18.3	4010	27.6	4010	27.6	4010	27.6	951	423	649	289	-	-	1042	464
		J-55	65.0	96.7	3300	22.8	4370	30.1	-	-	-	-	1035	460	-	-	-	-	-	-
		M-65	47.0	69.9	1590	11.0	3630	25.0	3630	25.0	3630	25.0	871	387	557	248	-	-	930	414
		M-65	54.0	80.4	2250	15.5	4210	29.0	4210	29.0	4210	29.0	1005	447	664	295	-	-	1074	478
		M-65	60.0	89.3	2840	19.6	4730	32.6	4730	32.6	4730	32.6	1124	500	759	338	-	-	1201	534

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
11 3/4	298.5	C-75	47.0	69.9	1630	11.2	4190	28.9	4190	28.9	4190	28.9	1005	447	638	284	-	-	1054	469
		C-75	54.0	80.4	2390	16.5	4860	33.5	4860	33.5	4860	33.5	1160	516	760	338	-	-	1216	541
		C-75	60.0	89.3	3070	21.2	5460	37.6	5460	37.6	5460	37.6	1298	577	869	387	-	-	1361	605
		C-75	65.0	96.7	3790	26.1	5960	41.1	-	-	-	-	1411	-	-	-	-	-	-	-
		C-75	71.0	105.7	4720	32.5	6500	44.8	-	-	-	-	1531	-	-	-	-	-	-	-
		C-75	75.0	111.6	5430	37.4	6900	47.6	-	-	-	-	1621	-	-	-	-	-	-	-
		C-75	79.0	117.6	6170	42.5	7330	50.5	-	-	-	-	1715	-	-	-	-	-	-	-
		C-75	83.0	123.5	6850	47.2	7720	53.2	-	-	-	-	1801	-	-	-	-	-	-	-
		L-80	47.0	69.9	1630	11.2	4470	30.8	4470	30.8	4470	30.8	1072	477	670	298	-	-	1084	482
		L-80	54.0	80.4	2440	16.8	5180	35.7	5180	35.7	5180	35.7	1237	550	798	355	-	-	1250	556
		L-80	60.0	89.3	3180	21.9	5830	40.2	5830	40.2	5830	40.2	1384	616	913	406	-	-	1399	622
		L-80	65.0	96.7	3870	26.7	6360	43.9	-	-	-	-	1505	669	-	-	-	-	-	-
		L-80	71.0	105.7	4880	33.6	6930	47.8	-	-	-	-	1634	727	-	-	-	-	-	-
		L-80	75.0	111.6	5630	38.8	7360	50.7	-	-	-	-	1729	769	-	-	-	-	-	-
		L-80	79.0	117.6	6420	44.3	7820	53.9	-	-	-	-	1829	814	-	-	-	-	-	-
		L-80	83.0	123.5	7150	49.3	8230	56.7	-	-	-	-	1921	855	-	-	-	-	-	-
		C-90	60.0	89.3	3360	23.2	6550	45.2	6550	45.2	6550	45.2	1557	693	1011	450	-	-	1517	675
		C-90	65.0	96.7	4060	28.0	7160	49.4	-	-	-	-	1693	753	-	-	-	-	-	
		C-90	71.0	105.7	5130	35.4	7800	53.8	-	-	-	-	1838	818	-	-	-	-	-	

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
11 3/4	298.5	C-95	60.0	89.3	3440	23.7	6920	47.7	6920	47.7	6920	47.7	1643	731	1066	474	-	-	1596	710
		C-95	65.0	96.7	4170	28.8	7560	52.1	-	-	-	-	1788	795	-	-	-	-	-	-
		C-95	71.0	105.7	5240	36.1	8230	56.7	-	-	-	-	1940	863	-	-	-	-	-	-
		P-110	47.0	69.9	1630	11.2	6140	42.3	6140	42.3	6140	42.3	1474	656	912	406	-	-	1454	647
		P-110	54.0	80.4	2570	17.7	7130	49.2	7130	49.2	7130	49.2	1701	757	1086	483	-	-	1677	746
		P-110	60.0	89.3	3610	24.9	8010	55.2	8010	55.2	8010	55.2	1903	846	1242	552	-	-	1877	835
		P-110	65.0	96.7	4480	30.9	8750	60.3	-	-	-	-	2070	921	-	-	-	-	-	-
		P-110	71.0	105.7	5470	37.7	9530	65.7	-	-	-	-	2246	999	-	-	-	-	-	-
		P-110	75.0	111.6	6540	45.1	10120	69.8	-	-	-	-	2377	1057	-	-	-	-	-	-
		P-110	79.0	117.6	7650	52.7	10750	74.1	-	-	-	-	2515	1119	-	-	-	-	-	-
		P-110	83.0	123.5	8710	60.1	11320	78.0	-	-	-	-	2641	1175	-	-	-	-	-	-
		Q125	60.0	89.3	3680	25.4	9100	62.7	9100	62.7	9100	62.7	2162	962	1395	621	-	-	2074	923
		Q125	65.0	96.7	4690	32.3	9940	68.5	-	-	-	-	2352	1046	-	-	-	-	-	-
		Q125	71.0	105.7	5760	39.7	10840	74.7	-	-	-	-	2352	1046	-	-	-	-	-	-
11 7/8	301.6	P-110	71.8	106.9	5290	36.5	9430	65.0	-	-	-	-	2271	1010	-	-	-	-	-	-

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
13 3/8	339.7	H-40	48.0	71.4	740	5.1	1730	11.9	1730	11.9	-	-	541	241	322	143	-	-	-	-
		J-55	54.5	81.1	1130	7.8	2730	18.8	2730	18.8	2730	18.8	853	379	514	229	-	-	909	404
		J-55	61.0	90.8	1540	10.6	3090	21.3	3090	21.3	3090	21.3	962	428	595	265	-	-	1025	456
		J-55	68.0	101.2	1950	13.4	3450	23.8	3450	23.8	3450	23.8	1069	476	675	300	-	-	1140	507
		J-55	72.0	107.1	2230	15.4	3700	25.5	3700	25.5	3700	25.5	1142	508	730	325	-	-	1217	541
		J-55	77.0	114.6	2580	17.8	3960	27.3	-	-	3960	27.3	1219	542	-	-	-	-	1299	578
		J-55	85.0	126.5	3300	22.8	4380	30.2	-	-	4380	30.2	1341	597	-	-	-	-	1430	636
		J-55	92.0	136.9	4080	28.1	4840	33.4	-	-	4490	31.0	1475	656	-	-	-	-	1572	699
		J-55	98.0	145.8	4660	32.1	5170	35.6	-	-	4490	31.0	1572	699	-	-	-	-	1676	746
		M-65	54.5	81.1	1140	7.9	3230	22.3	3230	22.3	3230	22.3	1008	448	602	268	-	-	1052	-
		M-65	61.0	90.8	1620	11.2	3660	25.2	3660	25.2	3660	25.2	1137	506	697	310	-	-	1185	-
		M-65	68.0	101.2	2100	14.5	4080	28.1	4080	28.1	4080	28.1	1264	562	790	351	-	-	1318	-
		C-75	61.0	90.8	1660	11.4	4220	29.1	4220	29.1	4220	29.1	1312	584	798	355	-	-	1345	598
		C-75	68.0	101.2	2220	15.3	4710	32.5	4550	31.4	4710	32.5	1458	649	905	403	-	-	1496	665
		C-75	72.0	107.1	2600	17.9	5040	34.7	4550	31.4	4930	34.0	1558	693	978	435	-	-	1598	711
		C-75	77.0	114.6	3000	20.7	5400	37.2	-	-	5400	37.2	1662	739	-	-	-	-	1705	758
		C-75	85.0	126.5	3790	26.1	5970	41.2	-	-	5970	41.2	1829	814	-	-	-	-	1876	834
		C-75	92.0	136.9	4890	33.7	6590	45.4	-	-	6120	42.2	2011	895	-	-	-	-	2063	918
		C-75	98.0	145.8	5690	39.2	7060	48.7	-	-	6120	42.2	2144	954	-	-	-	-	2200	979

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
13 3/8	339.7	L-80	61.0	90.8	1670	11.5	4500	31.0	4500	31.0	4500	31.0	1399	622	839	373	-	-	1389	618
		L-80	68.0	101.2	2260	15.6	5020	34.6	5020	34.6	5020	34.6	1556	692	952	423	-	-	1545	687
		L-80	72.0	107.1	2670	18.4	5380	37.1	5380	37.1	5380	37.1	1661	739	1029	458	-	-	1650	734
		L-80	77.0	114.6	3100	21.4	5760	39.7	-	-	5760	39.7	1773	789	-	-	-	-	1761	783
		L-80	85.0	126.5	3870	26.7	6360	43.9	-	-	6360	43.9	1951	868	-	-	-	-	1938	862
		L-80	92.0	136.9	5050	34.8	7030	48.5	-	-	6530	45.0	2145	954	-	-	-	-	2131	948
		L-80	98.0	145.8	5910	40.7	7530	51.9	-	-	6530	45.0	2287	1017	-	-	-	-	2271	1010
		C-90	68.0	101.2	2320	16.0	5650	39.0	5650	39.0	5650	39.0	1750	778	1057	470	-	-	1683	749
		C-90	72.0	107.1	2780	19.2	6050	41.7	6050	41.7	6050	41.7	1869	831	1142	508	-	-	1797	799
		C-95	68.0	101.2	2330	16.1	5970	41.2	5970	41.2	5970	41.2	1847	822	1114	496	-	-	1772	788
		C-95	72.0	107.1	2820	19.4	6390	44.1	6390	44.1	6390	44.1	1973	878	1204	536	-	-	1893	842
		P-110	61.0	90.8	1670	11.5	6190	42.7	6190	42.7	6190	42.7	1924	856	1142	508	-	-	1870	832
		P-110	68.0	101.2	2330	16.1	6910	47.6	6910	47.6	6910	47.6	2139	951	1297	577	-	-	2079	925
		P-110	72.0	107.1	2880	19.9	7400	51.0	7400	51.0	7400	51.0	2284	1016	1401	623	-	-	2221	988
		P-110	77.0	114.6	3490	24.1	7920	54.6	-	-	7920	54.6	2438	1084	-	-	-	-	2370	1054
		P-110	85.0	126.5	4490	31.0	8750	60.3	-	-	8750	60.3	2682	1193	-	-	-	-	2608	1160
		P-110	92.0	136.9	5720	39.4	9670	66.7	-	-	8980	61.9	2950	1312	-	-	-	-	2868	1276
		P-110	98.0	145.8	6950	47.9	10350	71.4	-	-	8980	61.9	3145	1399	-	-	-	-	3018	1342
		Q125	72.0	107.1	2880	19.9	8410	58.0	8410	58.0	8410	58.0	2596	1155	1576	701	-	-	2463	1096

Pressure in MPa = KPa x 1000

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CASING PERFORMANCE PROPERTIES (API Bul 5C2)

Casing O.D.		Casing Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure						Pipe Body Yield Stength		Joint Pull Strength					
							Plain End		Round Thrd(L/S)		Buttress Thrd				Round short thd.		Round long thd.		Buttress Thrd.	
													1000	1000	1000	1000	1000	1000	1000	1000
in	mm		lb/ft	kg/m	psi	MPa	psi	MPa	psi	MPa	psi	MPa	lb	daN	lb	daN	lb	daN	lb	daN
16	406.4	H-40	65.0	96.7	630	4.3	1640	11.3	1640	11.3	-	-	736	327	439	195	-	-	-	-
		J-55	75.0	111.6	1020	7.0	2630	18.1	2630	18.1	2630	18.1	1178	524	710	316	-	-	1200	534
		J-55	84.0	125.0	1410	9.7	2980	20.5	2980	20.5	2980	20.5	1326	590	817	363	-	-	1351	601
		J-55	109.0	162.2	2560	17.7	3950	27.2	-	-	-	-	1739	774	-	-	-	-	-	-
		M-65	75.0	111.6	1020	7.0	3110	21.4	3110	21.4	3110	21.4	1392	619	832	370	-	-	1394	620
		M-65	84.0	125.0	1460	10.1	3520	24.3	3520	24.3	3520	24.3	1567	697	957	426	-	-	1570	698
		L-80	109.0	162.2	3080	21.2	5740	39.6	-	-	-	-	2530	1125	-	-	-	-	-	-
		C-95	109.0	162.2	3320	22.9	6820	47.0	-	-	-	-	3004	1336	-	-	-	-	-	-
		P-110	109.0	162.2	3470	23.9	7890	54.4	-	-	-	-	3478	1547	-	-	-	-	-	-
		Q125	109.0	162.2	3520	24.3	8970	61.8	-	-	-	-	3953	1758	-	-	-	-	-	-
18 5/8	473.1	H-40	87.5	130.2	630	4.3	1630	11.2	1630	11.2	-	-	994	442	559	249	-	-	-	-
		J-55	87.5	130.2	630	4.3	2250	15.5	2250	15.5	2250	15.5	1367	608	754	335	-	-	1329	591
		M-65	87.5	130.2	630	4.3	2660	18.3	2660	18.3	2660	18.3	1616	719	884	393	-	-	1552	690
20	508.0	H-40	94.0	139.9	520	3.6	1530	10.5	1530	10.5	-	-	1077	479	581	258	673	299	-	-
		J-55	94.0	139.9	520	3.6	2110	14.5	2110	14.5	2110	14.5	1480	658	783	348	907	403	1402	624
		J-55	106.5	158.5	770	5.3	2410	16.6	2410	16.6	2410	16.6	1685	750	913	406	1056	470	1595	709
		J-55	133.0	197.9	1500	10.3	3060	21.1	3060	21.1	3060	21.1	2125	945	1192	530	1379	613	2012	895
		M-65	94.0	139.9	520	3.6	2490	17.2	2490	17.2	2490	17.2	1750	778	918	408	1063	473	1643	731
		M-65	106.5	158.5	770	5.3	2840	19.6	2840	19.6	2840	19.6	1991	886	1070	476	1238	551	1870	832

Pressure in MPa = KPa x 1000

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Notes:

Minimum internal yield pressure is the lowest of the internal yield pressure of the pipe or the internal yield pressure of the coupling. The pressure leak resistance at the E1 or E7 plane is less than the internal yield pressure at minimum yield.

For J-55 and K55 casing the next higher grade is L-80.

For N-80 casing the next higher grade is P-110.

For P-110 casing the next higher grade is Q125

No higher grades have been established for other grades.

Leak resistance is as follows:

PRESSURE LEAK RESISTANCE					
SIZE		STC	LTC	BTC	BTC SPL CLR CPLG
4 1/2		17920	17920	17380	13910
5		16000	16000	19580	14240
5 1/2		13160	13160	16100	11880
6 5/8		11830	11830	14780	8310
7		9520	9520	11790	7480
7 5/8		11800	11800	12680	8030
8 5/8		10380	10380	11230	6340
9 5/8	C/T-95 and lower	8460	8460	9160	5140
9 5/8	P-110 and higher	9710	9710	9160	5140
10 3/4	C/T-95 and lower	6880	-	7450	4150
10 3/4	P-110 and higher	7890	-	7450	4150
11 3/4		5820	-	6300	4150
13 3/8		4550	-	4950	-
16		3230	-	3560	-
18 5/8		3150	-	3500	-
20	H-40	2100	2100	2320	-
20	J-55 and Higher	2410	2410	2320	-

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CASING MAKE-UP TORQUE GUIDE
SHORT THREAD
RECOMMENDED MAKE-UP TORQUE

O.D. In. mm	Nominal Weight lb/ft - kg/m	Grade	Torque ft-lb—kg-m					
			Minimum		Optimum		Maximum	
	9.5	H - 40	580	**80**	770	**105**	960	**130**
	14.13	J - 55	760	**105**	1010	**140**	1260	**175**
		K - 55	840	**115**	1120	**155**	1400	**195**
4-1/2	10.5	J - 55	990	**135**	1320	**180**	1650	**230**
114.3	**15.62**	K - 55	1100	**150**	1460	**200**	1830	**255**
	11.6	J - 55	1160	**160**	1540	**215**	1930	**265**
	17.26	K - 55	1280	**175**	1700	**235**	2130	**295**
	11.5	J - 55	1000	**140**	1330	**185**	1660	**230**
	17.11	K - 55	1100	**150**	1470	**205**	1840	**255**
5	13.0	J - 55	1270	**175**	1690	**235**	2110	**290**
127	**19.34**	K - 55	1400	**195**	1860	**255**	2330	**320**
	15.0	J - 55	1550	**215**	2070	**285**	2590	**360**
	22.32	K - 55	1710	**235**	2280	**315**	2850	**395**
	14.0	H - 40	980	**135**	1300	**180**	1630	**225**
	20.83	J - 55	1290	**180**	1720	**240**	2150	**295**
		K - 55	1420	**195**	1890	**260**	2360	**325**
5-1/2	15.5	J - 55	1520	**210**	2020	**280**	2530	**350**
139.7	**23.06**	K - 55	1670	**230**	2220	**310**	2780	**380**
	17.0	J - 55	1720	**240**	2290	**320**	2860	**390**
	25.30	K - 55	1890	**260**	2520	**350**	3150	**430**
	20.0	H - 40	1380	**190**	1840	**250**	2300	**320**
	29.76	J - 55	1840	**250**	2450	**340**	3060	**420**
6-5/8		K - 55	2000	**280**	2670	**370**	3340	**460**
168.3	24.0	J - 55	2360	**330**	3140	**430**	3930	**540**
	35.71	K - 55	2570	**360**	3420	**470**	4230	**580**
	17.0	H - 40	920	**125**	1220	**170**	1530	**210**
	25.29							
	20.0	H - 40	1320	**185**	1760	**245**	2200	**305**
	29.76	J - 55	1760	**245**	2340	**325**	2930	**405**
7		K - 55	1910	**265**	2540	**350**	3180	**440**
177.8	23.0	J - 55	2130	**295**	2840	**390**	3550	**490**
	34.22	K - 55	2320	**320**	3090	**430**	3860	**530**
	26.0	J - 55	2510	**350**	3340	**460**	4180	**580**
	38.68	K - 55	2730	**380**	3640	**500**	4550	**630**
	24.0	H - 40	1590	**220**	2120	**290**	2650	**370**
	35.71							
7-5/8	26.4	J - 55	2360	**330**	3150	**440**	3940	**540**
193.7	**39.28**	K - 55	2570	**360**	3420	**470**	4280	**590**

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CASING MAKE-UP TORQUE GUIDE
SHORT THREAD
RECOMMENDED MAKE-UP TORQUE

O.D. In. mm	Nominal Weight lb/ft - kg/m	Grade	Torque ft-lb—kg-m					
			Minimum		Optimum		Maximum	
8-5/8 219.1	24.0	J - 55	1830	**250**	2440	**340**	3050	**420**
	35.71	K - 55	1970	**270**	2630	**360**	3290	**450**
	28.0	H - 40	1750	**240**	2330	**320**	2910	**400**
	41.66							
	32.0	H - 40	2090	**290**	2790	**390**	3490	**480**
	47.61	J - 55	2790	**390**	3720	**510**	4650	**640**
		K - 55	3020	**420**	4020	**560**	5030	**690**
9-5/8 244.5	36.0	J - 55	3260	**450**	4340	**600**	5430	**750**
	53.56	K - 55	3510	**490**	4680	**650**	5850	**810**
	32.3	H - 40	1910	**265**	2540	**350**	3180	**440**
	48.06							
	36.0	H - 40	2210	**310**	2940	**410**	3680	**510**
	53.57	J - 55	2960	**410**	3940	**540**	4930	**680**
		K - 55	3170	**440**	4230	**580**	5290	**730**
	40.0	J - 55	3390	**470**	4520	**620**	5650	**780**
	59.51	K - 55	3650	**500**	4860	**670**	6080	**840**
10-3/4 273	32.75	H - 40	1540	**215**	2050	**280**	2560	**350**
	53.19							
	40.5	H - 40	2360	**330**	3140	**430**	3930	**540**
	60.26	J - 55	3150	**440**	4200	**580**	5250	**730**
		K - 55	3380	**470**	4500	**620**	5630	**780**
	45.5	J - 55	3700	**510**	4930	**680**	6160	**850**
	67.70	K - 55	3960	**550**	5280	**730**	6600	**910**
	51.0	J - 55	4240	**590**	5650	**780**	7060	**980**
	75.88	K - 55	4550	**630**	6060	**840**	7580	**1050**
		C - 75	5670	**780**	7560	**1050**	9450	**1300**
		N - 80	6030	**830**	8040	**1110**	10050	**1390**
		C - 95	6950	**960**	9270	**1280**	11590	**1600**
		P - 110	8100	**1120**	10800	**1490**	13500	**1870**
	55.5	C - 75	6320	**870**	8430	**1170**	10540	**1460**
	82.57	N - 80	6710	**930**	8950	**1240**	11190	**1550**
		C - 95	7740	**1070**	10320	**1430**	12900	**1780**
		P - 110	9020	**1250**	12030	**1660**	15040	**2080**
	60.7	P - 110	10040	**1390**	13380	**1850**	16730	**2310**
	90.31							
	65.7	P - 110	11040	**1530**	14720	**2040**	18400	**2540**
	97.75							

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CASING MAKE-UP TORQUE GUIDE
SHORT THREAD
RECOMMENDED MAKE-UP TORQUE

O.D. In. mm	Nominal Weight lb/ft - kg/m	Grade	Torque ft-lb—kg-m					
			Minimum		Optimum		Maximum	
	42.0	H - 40	2300	320	3070	420	3840	530
	62.49							
	47.0	J - 55	3580	500	4770	660	5960	820
	69.93	K - 55	3820	530	5090	700	6360	880
11-3/4	54.0	J - 55	4260	590	5680	790	7100	980
298.5	80.34	K - 55	4550	630	6060	840	7580	1050
	60.0	J - 55	4870	670	6490	900	8110	1120
	89.27	K - 55	5200	720	6930	960	8660	1200
		C - 75	6520	900	8690	1200	10860	1500
		N - 80	6930	960	9240	1280	11550	1600
		C - 95	8000	1110	10660	1470	13330	1840
	48.0	H - 40	2420	330	3220	450	4030	560
	71.41							
	54.5	J - 55	3860	530	5140	710	6430	890
	81.09	K - 55	4100	570	5470	760	6840	940
13-3/8	61.0	J - 55	4460	620	5950	820	7440	1030
339.7	90.76	K - 55	4750	660	6330	870	7910	1090
	68.0	J - 55	5060	700	6750	930	8440	1170
	101.17	K - 55	5390	750	7180	990	8980	1240
	72.0	C - 75	7340	1020	9780	1350	12230	1690
	107.12	N - 80	7800	1080	10400	1440	13000	1800
		C - 95	9030	1250	12040	1660	15050	2080
	65.0	H - 40	3290	460	4390	610	5490	760
	96.71							
16	75.0	J - 55	5330	740	7100	980	8880	1230
406.4	111.59	K - 55	5640	780	7520	1040	9400	1300
	84.0	J - 55	6130	850	8170	1130	10210	1410
	124.98	K - 55	6490	900	8650	1200	10810	1490
18-5/8	87.5	H - 40	4190	580	5590	770	6990	970
473.1	130.18	J - 55	5660	780	7540	1040	9430	1300
		K - 55	5960	820	7940	1100	9930	1370
20	94.0	H - 40	4360	600	5810	800	7260	1000
508	139.85	J - 55	5880	810	7840	1080	9800	1350
		K - 55	6180	850	8240	1140	10300	1420
	106.5	J - 55	6850	950	9130	1260	11410	1580
	158.45	K - 55	7200	1000	9600	1330	12000	1660
	133.0	J - 55	8940	1240	11920	1650	14900	2060
	197.90	K - 55	9400	1300	12530	1730	15660	2160

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CASING MAKE-UP TORQUE GUIDE
LONG THREAD
RECOMMENDED MAKE-UP TORQUE

O.D. In. mm	Nominal Weight lb/ft - kg/m	Grade	Torque ft-lb—kg-m					
			Minimum		Optimum		Maximum	
		J - 55	1220	**170**	1620	**225**	2030	**280**
		K - 55	1350	**185**	1800	**250**	2250	**310**
	11.6	C - 75	1610	**225**	2150	**295**	2690	**370**
	17.26	N - 80	1710	**235**	2280	**315**	2850	**395**
		C - 95	1940	**270**	2580	**355**	3230	**445**
4-1/2		P - 110	2270	**315**	3020	**420**	3780	**525**
114.3		C - 75	1950	**270**	2600	**360**	3250	**450**
	13.5	N - 80	2070	**285**	2760	**380**	3450	**475**
	20.09	C - 95	2350	**325**	3130	**430**	3910	**540**
		P - 110	2750	**380**	3660	**510**	4580	**630**
	15.1	P - 110	3300	**460**	4400	**610**	5500	**760**
	22.46							
	13.0	J - 55	1370	**190**	1820	**250**	2280	**315**
	19.34	K - 55	1510	**210**	2010	**280**	2510	**350**
		J - 55	1670	**230**	2230	**310**	2790	**380**
		K - 55	1850	**255**	2460	**340**	3080	**420**
	15.0	C - 75	2220	**310**	2960	**410**	3700	**510**
5	**22.32**	N - 80	2360	**330**	3140	**430**	3930	**540**
127		C - 95	2670	**370**	3560	**490**	4450	**610**
		P - 110	3130	**430**	4170	**580**	5210	**720**
		C - 75	2830	**390**	3770	**520**	4710	**650**
	18.0	N - 80	3000	**410**	4000	**550**	5000	**690**
	26.78	C - 95	3410	**470**	4550	**630**	5690	**790**
		P - 110	3980	**550**	5310	**730**	6640	**920**
	15.5	J - 55	1630	**225**	2170	**300**	2710	**370**
	23.06	K - 55	1790	**250**	2390	**330**	2990	**410**
		J - 55	1850	**255**	2470	**340**	3090	**430**
		K - 55	2040	**280**	2720	**380**	3400	**470**
	17.0	C - 75	2450	**340**	3270	**450**	4090	**560**
5-1/2	**25.30**	N - 80	2610	**360**	3480	**480**	4350	**600**
139.7		C - 95	2970	**410**	3960	**550**	4950	**680**
		P - 110	3470	**480**	4620	**640**	5780	**800**
		C - 75	3020	**420**	4030	**560**	5040	**700**
	20.0	N - 80	3210	**440**	4280	**590**	5350	**740**
	29.76	C - 95	3650	**500**	4870	**670**	6090	**840**
		P - 110	4270	**590**	5690	**790**	7110	**980**

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CASING MAKE-UP TORQUE GUIDE
LONG THREAD
RECOMMENDED MAKE-UP TORQUE

O.D. In. **mm**	Nominal Weight lb/ft - **kg/m**	Grade	Torque ft-lb—**kg-m**					
			Minimum		**Optimum**		**Maximum**	
		C - 75	3550	**490**	4730	**650**	5910	**820**
5-1/2	23.0	N - 80	3770	**520**	5020	**690**	6280	**870**
139.7	**34.22**	C - 95	4290	**590**	5720	**790**	7150	**990**
		P - 110	5010	**690**	6680	**920**	8350	**1150**
	20.0	J - 55	2000	**280**	2660	**370**	3330	**460**
	29,76	K - 55	2180	**300**	2900	**400**	3630	**500**
		J - 55	2550	**350**	3400	**470**	4250	**590**
		K - 55	2790	**390**	3720	**510**	4650	**640**
	24.0	C - 75	3400	**470**	4530	**630**	5660	**780**
	34.71	N - 80	3610	**500**	4810	**670**	6010	**830**
		C - 95	4120	**570**	5490	**760**	6860	**950**
6-5/8		P - 110	4810	**670**	6410	**890**	8010	**1110**
168.3		C - 75	4140	**570**	5520	**760**	6900	**950**
	28.0	N - 80	4400	**610**	5860	**810**	7330	**1010**
	41.66	C - 95	5020	**690**	6690	**930**	8360	**1160**
		P - 110	5860	**810**	7810	**1080**	9760	**1350**
		C - 75	4790	**660**	6380	**880**	7980	**1100**
	32.0	N - 80	5080	**700**	6770	**940**	8460	**1170**
	47.62	C - 95	5810	**800**	7740	**1070**	9680	**1340**
		P - 110	6780	**940**	9040	**1250**	11300	**1560**
		J - 55	2350	**330**	3130	**430**	3910	**540**
	23.0	K - 55	2560	**350**	3410	**470**	4260	**590**
	34.22	C - 75	3120	**430**	4160	**580**	5200	**720**
		N - 80	3320	**460**	4420	**611**	5530	**760**
		C - 95	3790	**520**	5050	**700**	6310	**870**
		J - 55	2750	**380**	3670	**510**	4590	**630**
		K - 55	3010	**420**	4010	**550**	5010	**690**
7	26.0	C - 75	3670	**510**	4890	**680**	6110	**840**
177.8	**38.68**	N - 80	3890	**540**	5190	**720**	6490	**900**
		C - 95	4450	**620**	5930	**820**	7410	**1020**
		P - 110	5200	**720**	6930	**960**	8660	**1200**
		C - 75	4220	**580**	5620	**780**	7030	**970**
	29.0	N - 80	4480	**620**	5970	**830**	7460	**1030**
	43.15	C - 95	5120	**710**	6830	**940**	8540	**1180**
		P - 110	5980	**830**	7970	**1100**	9960	1380

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CASING MAKE-UP TORQUE GUIDE
LONG THREAD
RECOMMENDED MAKE-UP TORQUE

O.D. In. mm	Nominal Weight lb/ft - kg/m	Grade	Torque ft-lb — kg-m					
			Minimum		Optimum		Maximum	
	32.0	C - 75	4750	**660**	6330	**880**	7910	**1090**
	47.61	N - 80	5040	**700**	6720	**930**	8400	**1160**
		C - 95	5760	**800**	7680	**1060**	9600	**1330**
		P - 110	6730	**930**	8970	**1240**	11210	**1550**
	35.0	C - 75	5270	**730**	7030	**970**	8790	**1220**
7	**52.07**	N - 80	5600	**770**	7460	**1030**	9330	**1290**
177.8		C - 95	6400	**890**	8530	**1180**	10660	**1470**
		P - 110	7470	**1030**	9960	**1380**	12450	**1720**
	38.0	C - 75	5750	**800**	7670	**1060**	9590	**1330**
	56.54	N - 80	6110	**850**	8140	**1130**	10180	**1410**
		C - 95	6980	**970**	9310	**1290**	11640	**1610**
		P - 110	8150	**1130**	10870	**1500**	13590	**1880**
	26.4	J - 55	2600	**360**	3460	**480**	4330	**600**
	39.28	K - 55	2830	**390**	3770	**520**	4710	**650**
		C - 75	3460	**480**	4610	**640**	5760	**800**
7-5/8		N - 80	3680	**510**	4900	**680**	6130	**850**
193.7		C - 95	4200	**580**	5600	**770**	7000	**970**
	29.7	C - 75	4070	**560**	5420	**750**	6780	**940**
	44.19	N - 80	4310	**600**	5750	**800**	7190	**990**
		C - 95	4940	**680**	6590	**910**	8240	**1140**
		P - 110	5770	**800**	7690	**1060**	9610	**1330**
	33.7	C - 75	4760	**660**	6350	**880**	7940	**1100**
	50.14	N - 80	5060	**700**	6740	**930**	8430	**1160**
		C - 95	5790	**800**	7720	**1070**	9650	**1330**
		P - 110	6760	**930**	9010	**1250**	11260	**1560**
	39.0	C - 75	5630	**780**	7510	**1040**	9390	**1300**
	58.03	N - 80	5980	**830**	7980	**1100**	9980	**1380**
		C - 95	6860	**950**	9140	**1260**	11430	**1580**
		P - 110	8000	**1110**	10660	**1470**	13330	**1840**
	32.0	J - 55	3130	**430**	4170	**580**	5210	**720**
	47.61	K - 55	3390	**470**	4520	**630**	5650	**780**
		J - 55	3650	**500**	4860	**670**	6080	**840**
8-5/8	36.0	K - 55	3950	**550**	5260	**730**	6580	**910**
219.1	**53.56**	C - 75	4860	**670**	6480	**900**	8100	**1120**
		N - 80	5160	**710**	6880	**950**	8600	**1190**
		C - 95	5920	**820**	7890	**1090**	9860	**1360**

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CASING MAKE-UP TORQUE GUIDE
LONG THREAD
RECOMMENDED MAKE-UP TORQUE

O.D. In. mm	Nominal Weight lb/ft - kg/m	Grade	Torque ft-lb — kg-m					
			Minimum		Optimum		Maximum	
	40.0	C - 75	5570	**770**	7420	**1030**	9280	**1280**
	59.51	N - 80	5910	**820**	7880	**1090**	9850	**1360**
		C - 95	6780	**940**	9040	**1250**	11300	**1560**
		P - 110	7910	**1090**	10550	**1460**	13190	**1820**
8-5/8	44.0	C - 75	6260	**870**	8340	**1150**	10430	**1440**
219.1	**65.47**	N - 80	6650	**920**	8870	**1230**	11090	**1530**
		C - 95	7630	**1060**	10170	**1410**	12710	**1760**
		P - 110	8900	**1230**	11860	**1640**	14830	**2050**
	49.0	C - 75	7040	**970**	9390	**1300**	11740	**1620**
	72.91	N - 80	7480	**1030**	9970	**1380**	12460	**1720**
		C - 95	8580	**1190**	11440	**1580**	14300	**1980**
		P - 110	10010	**1380**	13350	**1850**	16690	**2310**
	36.0	J - 55	3400	**470**	4530	**630**	5660	**780**
	53.57	K - 55	3670	**510**	4890	**680**	6110	**850**
	40.0	J - 55	3900	**540**	5200	**720**	6500	**900**
	59.51	K - 55	4210	**580**	5610	**780**	7010	**970**
		C - 75	5210	**720**	6940	**960**	8680	**1200**
		N - 80	5530	**760**	7370	**1020**	9210	**1270**
		C - 95	6350	**880**	8470	**1170**	10590	**1460**
	43.5	C - 75	5820	**800**	7760	**1070**	9700	**1340**
9-5/8	**64.73**	N - 80	6190	**860**	8250	**1140**	10310	**1420**
244.5		C - 95	7110	**980**	9480	**1310**	11850	**1640**
		P - 110	8300	**1150**	11060	**1530**	13830	**1910**
	47.0	C - 75	6390	**880**	8520	**1180**	10650	**1470**
	69.93	N - 80	6790	**940**	9050	**1250**	11310	**1560**
		C - 95	7800	**1080**	10400	**1440**	13000	**1800**
		P - 110	9100	**1260**	12130	**1680**	15160	**2100**
	53.5	C - 75	7490	**1040**	9990	**1380**	12490	**1730**
	79.60	N - 80	7970	**1100**	10620	**1470**	13280	**1840**
		C - 95	9150	**1270**	12200	**1690**	15250	**2110**
		P - 110	10670	**1480**	14220	**1970**	17780	**2460**
	94.0	J - 55	6800	**940**	9070	**1250**	11340	**1570**
	139.85	K - 55	7160	**990**	9550	**1320**	11940	**1650**
20	106.5	J - 55	7930	**1100**	10570	**1460**	13110	**1810**
508	158.45	K - 55	8350	**1150**	11130	**1540**	13410	**1920**
	133.0	J - 55	10350	**1430**	13800	**1910**	17250	**2380**
	197.90	K - 55	10900	**1510**	14530	**2010**	18160	**2510**

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ATLAS - BRADFORD
TC - 4S QUADRASEAL
RECOMMENDED MAKE-UP TORQUE

O.D.		Weight		Torque ft-lb—kg-m Grade					
				J-55		C-75& N-80		P-110	
In.	mm	lb/ft	kg/m						
		9.5 & 10.5	**14.13 & 15.62**	2600	**360**	3600	**500**	5000	**690**
		11.6, 12.6 & 13.5	**17.26, 18.75 & 20.09**	3000	**410**	4000	**550**	5500	**760**
4-1/2	**114.3**	15.1	**22.46**	3500	**480**	4500	**620**	6000	**830**
		17.1	**25.45**	4000	**550**	5000	**690**	6500	**900**
		20.1 & 21.6	**29.76 & 32.14**	5000	**690**	6000	**830**	7500	**1040**
		11.5	**17.11**	2800	**390**	4000	**550**	5000	**690**
5	**127**	13.0 & 15.0	**19.34 & 22.32**	3000	**410**	4000	**550**	5000	**690**
		18.0	**26.78**	4000	**550**	5000	**690**	6200	**860**
		23.6	**35.12**	6000	**830**	7000	**970**	8500	**1180**
		14.0 & 15.5	**20.83 & 23.06**	3900	**540**	5000	**690**	6000	**830**
5-1/2	**139.7**	17.0 & 20.0	**25.30 & 29.76**	5000	**690**	6000	**830**	7100	**980**
		23.0	**34.22**	6000	**830**	7000	**970**	7800	**1080**
		26.0 & 28.4	**38.68 & 42.26**	7300	**1010**	8200	**1130**	8700	**1200**
		20.0	**29.76**	5000	**690**	6000	**830**	7200	**1000**
6-5/8	**168.3**	24.0	**35.71**	6200	**860**	7000	**970**	8200	**1130**
		28.0	**41.66**	7300	**1010**	8000	**1110**	9000	**1240**
		32.0	**47.62**	8000	**1110**	9000	**1240**	9500	**1310**
		17.0	**25.29**	5000	**690**	6700	**930**	7500	**1040**
		20.0 & 23.0	**29.76 & 34.22**	5500	**760**	7200	**1000**	8500	**1180**
7	**177.8**	26.0	**38.68**	7000	**970**	8000	**1110**	9500	**1310**
		29.0	**43.15**	7500	**1040**	9000	**1240**	10000	**1380**
		32.0 & 35.0	**47.61 & 52.07**	8500	**1180**	10000	**1380**	11000	**1520**
		38.0 & 41.0	**56.54 & 61.00**	9000	**1240**	10500	**1450**	11500	**1590**
		26.4	**39.28**	6800	**940**	8000	**1110**	9000	**1240**
7-5/8	**193.7**	29.7	**44.19**	7300	**1010**	8500	**1180**	9500	**1310**
		33.7	**50.14**	8800	**1220**	10000	**1380**	11000	**1520**
		39.0	**58.03**	9800	**1360**	11000	**1520**	12000	**1660**
		24.0 & 28.0	35.71 & 41.66	7300	**1010**	8500	**1180**	9500	**1310**
		32.0	**47.61**	7800	**1080**	9000	**1240**	10000	**1380**
8-5/8	**219.1**	36.0	**53.56**	9000	**1240**	10000	**1380**	11500	**1590**
		40.0	**59.51**	10000	**1380**	11000	**1520**	12500	**1730**
		44.0	**65.47**	10500	**1450**	12000	**1660**	13500	**1870**
		49.0					**1800**		**2010**

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ATLAS - BRADFORD
TC - 4S QUADRASEAL
RECOMMENDED MAKE-UP TORQUE

O.D.		Weight		Torque ft-lb—kg-m					
				Grade					
In.	mm	lb/ft	kg/m	J-55		C-75& N-80		P-110	
9-5/8	244.5	36.0	53.57	8000	1110	9500	1310	10500	1450
		40.0	59.51	9000	1240	10000	1380	12000	1660
		43.5	64.73	10000	1380	11000	1520	13500	1870
		47.0	69.93	11000	1520	12000	1660	14500	2010
		53.5	79.60	12500	1730	14000	1940	16000	2210
10-3/4	273.05	40.5	60.26	10500	1450	12000	1660	13000	1800
		45.5	67.70	12000	1660	13000	1800	14500	2010
		51.0	75.88	13000	1800	14000	1940	15500	2140
		55.5	82.57	14500	2110	15500	2140	17000	2350
		60.7	90.31	15500	2140	16500	2280	18000	2490
		65.7	97.75	17000	2350	18000	2490	20000	2770

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ATLAS - BRADFORD
FL-3S AND FL-4S
RECOMMENDED MAKE-UP TORQUE

O.D.		Nominal Weight		Torque ft-lb—kg-m			
				Grade			
In.	mm	lb/ft.	kg/m	J-55 & K-55		C-75, N-80 & P-110	
4-1/2	114.3	9.5 & 10.5	14.13 & 15.62	2500	350		
		11.6 & 12.6	17.26 & 18.75	2700	370	3200	440
		13.5 & 15.1	20.09 & 22.46	3000	410	3500	480
		17.7 & 20.0	26.33 & 29.16	3200	440	3700	510
5	127	11.5 & 13.0	17.11 & 19.34	3000	410		
		15.0 & 18.0	22.32 & 26.78	3500	480	4000	550
		23.6	35.12	4000	550	4500	620
5-1/2	139.7	14.0 & 15.5	20.83 & 23.06	3800	530		
		17.0	25.30	3800	530	4500	620
		20.0 & 23.0	29.76 & 34.22	4200	580	5000	690
		26.0	38.68	4500	620	5300	730
6-5/8	168.3	20.0	29.76	4500	620		
		24.0	35.71	4700	650	6000	830
		28.0	41.66	5000	690	6300	870
		32.0	47.62			6500	900
7	177.8	20.0 & 23.0	29.76 & 34.22	4000	550	5500	760
		26.0 & 29.0	38.68 & 43.15	5000	690	7000	970
		32.0, 35.0 & 38.0	47.61, 52.07 & 56.54			7500	1040
7-5/8	193.7	26.4	39.28	5000	690	6500	900
		29.7, 33.7 & 39.0	44.19, 50.14 & 58.03			7500	1040
8-5/8	219.1	24.0 & 28.0	35.71 & 41.66	5000	690		
		32.0 & 36.0	47.61 & 53.56	5500	760	7000	970
		40.0	59.51			8000	1110
		44.0 & 49.0	65.47 & 72.91			8500	1170

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ARMCO SEAL-LOCK
RECOMMENDED MAKE-UP TORQUE

O.D.		Torque ft-lb—kg-m					
In.	mm	Minimum		Optimum		Maximum	
4-1/2	**114.3**	1200	**165**	1600	**220**	2000	**275**
5-1/2	**139.7**	3000	**410**	3500	**480**	5000	**690**
7	**177.8**	4200	**580**	5000	**690**	6200	**860**
7-5/8	**193.7**	4500	**620**	5500	**760**	6500	**900**
8-5/8	**219.1**	5100	**710**	6100	**840**	7100	**980**
9-5/8	**244.5**	6000	**830**	7000	**970**	8000	**1110**
10-3/4	**273**	6500	**900**	7500	**1040**	8500	**1170**
13-3/8	**339.7**	6500	**900**	7500	**1040**	9500	**1310**

Note: Above torque figures applicable to all weights and grades for the listed sizes. To make up Seal-Lock casing in service, establish the torque required for 5-1/4 to 5-1/2 turns for sizes 4-1/2 through 10-3/4in.,6-1/4 to 6-1/2 turns for 13-3/8 in,; from the stabbed position. Final make-up should be 1 to 1-1/4 turns beyond hand tight. After determining the torque required for 5 or 6 joints, the remainder of the string may be run with this torque. The observed torque values given above may be used as a guide.

Special Clearance Couplings may require up to 1000 ft-lb less torque than Regular Couplings. Field observations indicate that make-up torques for Seal-Lock casing in general lie in the upper half of the above ranges; that is, between the optimum and maximum values. Armco recommends the use of API modified thread lubricant **only** for these threads.

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ARMCO API EXTREME LINE
RECOMMENDED MAKE-UP TORQUE

O.D.		Torque - Optimum Range			
In.	**mm**	ft-lb.	**kg-m**	ft-lb.	**kg-m**
5	**127**	2500	**3000**	350	**410**
5-1/2	**139.7**	2500	**3000**	350	**410**
6-5/8	**168.3**	3000	**3500**	410	**480**
7	**177.8**	3000	**3500**	410	**480**
7-5/8	**193.7**	3500	**4000**	480	**550**
8-5/8	**219.1**	4000	**4500**	550	**620**
9-5/8	**244.5**	4500	**5000**	620	**690**

Note: Above torque figures applicable to all weights and grades for the listed sizes. Optimum values may be exceeded by 1000 ft-lb without impairing connection. Torque values should be used together with a visual check as to the shoulder being closed or the box swelling excessively.

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HYDRIL FJ-P
RECOMMENDED MAKE-UP TORQUE

O.D.		Nominal Weight		Torque ft-lb—kg-m Grade					
				K-55 & N-80		P-110		S - 135 & V-150	
In.	mm	lb/ft.	kg/m						
4-1/2	114.3	All Weights 15.1 - 18.8	22.46 - 27.97	1500	210	2200	300	3000	410
5	127	All Weights 18.0 - 24.2	26.78 - 35.86	1900	260	2800	390	3800	530
5-1/2	139.7	All Weights 20.0 - 26.0	29.76 - 38.68	2300	320	3400	470	4600	640
6-5/8	168.3	28.0 & 32.0	41.66 & 47.62	3200	440	4800	660	6400	890
7	177.8	All Weights 26.0 - 38.0	38.68 - 56.54	3500	480	5000	690	7000	970
7-5/8	193.7	All Weights 26.4 - 45.3	39.28 - 67.40	4200	580	6000	830	8000	1110
7-3/4	196.8	46.1	68.60	5100	710	7500	1040	10000	1380
8-5/8	219.1	All Weights 32.0 - 52.0	47.61 - 77.31	5100	710	7500	1040	10000	1380
9-5/8	244.5	All Weights 36.0 - 58.4	53.57 - 86.88	6200	860	9000	1240	12000	1660
10-3/4	273	45.5 & 51.0 55.5, 60.7 & 65.7	67.70 - 75.88 82.57, 90.31 & 97.75	7000 10000	970 1380	13000	1800	15000	2070
11-3/4	298.5	47.0 & 54.0 60.0 & 65.0	69.93 & 80.34 89.27 & 96.70	7600 11000	1050 1520	13000	1800		
13-3/8	339.7	68.0 & 72.0	101.17 & 107.12	12000	1660				

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HYDRIL SUPER FJ-P
RECOMMENDED MAKE-UP TORQUE

O.D.		Nominal Weight		Torque ft-lb—kg-m Grade			
				N-80 & P-110		S - 135 & V-150	
In.	mm	lb/ft.	kg/m				
4-1/2	**114.3**	All Weights 15.1 - 18.8	**22.46 - 27.97**	3200	**440**	6000	**830**
5	**127**	All Weights 18.0 - 24.1	**26.78 - 35.86**	3800	**530**	7000	**970**
5-1/2	**139.7**	All Weights 20.0 - 26.0	**29.76 - 38.68**	4500	**620**	8500	**1170**
6-5/8	**168.3**	28.0 & 32.0	**41.66 & 47.62**	6000	**830**	10000	**1380**
7	**177.8**	26.0	**38.68, 43.15,**	5000	**690**	8000	**1110**
		29.0	**47.61, 52.07**	5500	**760**	10000	**1380**
		32.0, 35.0 & 38.0	**& 56.54**	6500	**900**	12000	**1660**
7-5/8	**193.7**	26.4	**39.28, 44.19,**	5000	**690**		
		29.7	**50.14,**	6000	**830**	9000	**1240**
		33.7	**58.03 - 67.40**	6000	**830**	11000	**1520**
		39.0 & 45.3		7000	**970**	13000	**1800**
7-3/4	**196.8**	46.1	**68.59**	8000	**1110**	14000	**1940**
8-5/8	**219.1**	32.0	**47.61, 53.56**	6000	**830**		
		36.0	**59.51 - 77.37**	7000	**970**		
		40.0 - 52.0		8000	**1110**	14000	**1940**
9-5/8	**244.5**	36.0	**53.57, 59.51**	8000	**1110**		
		40.0 & 43.5	**& 64.73**	9000	**1240**	13000	**1800**
		47.0 - 58.4	**69.93 - 86.88**	10000	**1380**	15000	**2070**
10-3/4	**273**	45.5 & 51.0	**67.70, 75.88**	9000	**1240**		
		55.5	**82.57, 90.31**	12000	**1660**		
		60.7 & 65.7	**& 97.75**	13000	**1800**	15000	**2070**
11-3/4	**298.5**	47.0	**69.93, 80.34,**	10000	**1380**		
		54.0, 60.0 & 65.0	**89.27 & 96.70**	13000	**1800**	15000	**2070**
13-3/8	**339.7**	61.0	**90.76, 101.17**	13000	**1800**		
		68.0 & 72.0	**& 107.12**	15000	**2070**		

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HYDRIL CTS
RECOMMENDED MAKE-UP TORQUE

O.D.		Nominal Weight		Torque ft-lb—kg-m Grade			
				P-110		V-150	
In.	mm	lb/ft.	kg/m				
4-1/2	**114.3**	All Weights 13.5 - 18.8	 **20.09 - 27.97**	4200	**580**	6000	**830**
5	**127**	All Weights 15.0 - 23.3	 **22.32 - 34.53**	5000	**690**	7000	**970**
5-1/2	**139.7**	All Weights 20.0 - 26.0	 **29.76 - 38.68**	6000	**830**	8500	**1170**
7	**177.8**	29.0 32.0, 35.0 & 38.0	**43.15, 47.61** **52.07 & 56.54**	8500	**1170**	10000 12000	**1380** **1660**
7-5/8	**193.7**	33.7 39.0 & 45.3	**50.14, 58.03** **& 67.40**	10000	**1380**	12000 14000	**1660** **1940**
9-5/8	**244.5**	53.5 & 58.4	**79.60 & 86.88**	15000	**2070**	18000	**2490**
10-3/4	**273**	60.7 & 65.7	**90.31 & 97.75**	18000	**2490**	18000	**2490**

HYDRIL CTS-4
RECOMMENDED MAKE-UP TORQUE

O.D.		Nominal Weight		Torque ft-lb—kg-m Grade			
				P-110		V-150	
In.	mm	lb/ft.	kg/m				
4-1/2	**114.3**	21.6, 24.6 & 26.5	**32.14, 32.60** **& 39.43**	8000	**1110**	10000	**1380**
5-1/2	**139.7**	32.3 & 36.4	**48.06 & 54.16**	10500	**1450**	13000	**1800**
7	**177.8**	41.0, 44.0 & 49.5	**61.00, 65.46** **& 73.65**	14000	**1940**	17500	**2420**

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HYDRIL TS TRIPLESEAL
RECOMMENDED MAKE-UP TORQUE

O.D.		Nominal Weight		Torque ft-lbó kg-m Grade			
				C-75 & N-80		P-110	
In.	mm	lb/ft.	kg/m				
4-1/2	**114.3**	All Weights 11.0 through 18.8	**16.36 27.97**	3200	**440**	4200	**580**
5	**127**	All Weights 13.0 through 23.2	**19.34 -34.53**	3800	**530**	5000	**690**
5-1/2	**139.7**	All Weights 14.0 through 26.0	**20.83 - 38.68**	4500	**620**	6000	**830**
6-5/8	**168.3**	All Weights 20.0 through 32.0	**29.76 - 47.62**	6000	**830**	7500	**1040**
7	**177.8**	All Weights 20.0 through 38.0	**29.76 - 56.54**	6500	**900**	8500	**1170**
7-5/8	**193.7**	All Weights 26.4 through 45.0	**39.28 - 67.40**	7500	**1040**	10000	**1380**
8-5/8	**219.1**	All Weights 32.0 through 49.0	**47.61 - 72.91**	9000	**1240**	12000	**1660**
9-5/8	**244.5**	All Weights 36.0 through 53.5	**53.57 - 79.60**	11000	**1520**	15000	**2070**
10-3/4	**273**	All Weights 40.5 through 65.7	**60.26 - 97.75**	13000	**1800**	18000	**2490**
11-3/4	**298.5**	All Weights 47.0 through 65.0	**69.93 - 96.70**	15000	**2070**	21000	**2900**
13-3/8	**339.7**	All Weights 68.0 through 98.0	**101.17 - 145.81**	20000	**2770**	27000	**3730**

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HYDRIL SUPER EU
RECOMMENDED MAKE-UP TORQUE

O.D.		Nominal Weight		Torque ft-lb—kg-m Grade			
				C-75 & N-80		P-110	
In.	mm	lb/ft.	kg/m				
5	**127**	All Weights 15.0 - 23.2	**22.32 - 34.53**	5000	**690**	7000	**970**
5-1/2	**139.7**	All Weights 15.5 - 26.0	**23.06 - 38.68**	6000	**830**	8000	**1110**
6-5/8	**168.3**	All Weights 24.0 - 32.0	**35.71 - 47.62**	7500	**1040**	10000	**1380**
7	**177.8**	All Weights 23.0 - 38.0	**34.22 - 56.54**	8500	**1170**	12000	**1660**
7-5/8	**193.7**	All Weights 26.4 - 45.3	**39.28 - 67.40**	9000	**1240**	13000	**1800**
8-5/8	**219.1**	All Weights 32.0 - 49.0	**47.61 - 72.91**	11000	**1520**	15000	**2070**
9-5/8	**244.5**	All Weights 36.0 - 53.5	**53.57 - 79.60**	13000	**1800**	17000	**2350**
10-3/4	**273**	All Weights 45.5 - 65.7	**67.70 - 97.75**	15000	**2070**	19000	**2630**

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VALLOUREC VAM
RECOMMENDED MAKE-UP TORQUE

O.D. In. mm	Nominal Weight lb/ft.	Nominal Weight kg/m	Grade	Torque ft-lb—kg-m					
				Minimum		Optimum		Maximum	
4-1/2	10.5	**15.62**	K-55	4000	**550**	4400	**600**	4700	**650**
114.3			C-75 N-80	4150	**575**	4500	**625**	4900	**675**
			C-90 C-95 P-110	4400	**600**	4700	**650**	5100	**700**
	11.6	**17.26**	K-55 C-75 N-80	4400	**600**	4700	**650**	5100	**700**
			C-90 C-95 P-110	4400	**600**	4700	**650**	5250	**725**
	12.6	**18.75**	K-55	4400	**600**	4700	**650**	5100	**700**
			C-75 N-80	4400	**600**	4700	**650**	5800	**800**
			C-90 C-95 P-105						
	13.5	**20.09**	K-55	4400	**600**	4700	**650**	5100	**700**
			C-75 N-80	5100	**700**	5400	**750**	6500	**900**
			C-90 C-95 P-110						
	15.1	**22.46**	K-55	5100	**700**	5400	**750**	6500	**900**
			C-75 N-80	5400	**750**	5800	**800**	6900	**950**
			C-90 C-95 P-110	5400	**750**	5800	**800**	7200	**1000**
	16.9	**24.70**	K-55	6200	**850**	6500	**900**	7600	**1050**
	17.7	**26.33**	C-75 N-80	6200	**850**	6500	**900**	8000	**1100**
	18.8	**27.97**	C-90 C-95 P-110						
5	13.0	**19.34**	K-55	3600	**500**	4000	**550**	4400	**600**
127			C-75 N-80	4400	**600**	5100	**700**	6500	**900**
			C-90 C-95 P-110						
	15.0	**22.32**	K-55	5100	**700**	5800	**800**	7200	**1000**
			C-75 N-80	5800	**800**	6500	**900**	8000	**1100**
			C-90 C-95 P-110						
	18.0	**26.78**	K-55 C-75 N-80	8000	**1100**	8700	**1200**	10100	**1400**
			C-90 C-95 P-110						
	20.8	**30.95**	K-55	9400	**1300**	10100	**1400**	10800	**1500**
			C-75 N-80	9400	**1300**	10100	**1400**	11500	**1600**
			C-90 C-95 P-110						

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VALLOUREC VAM
RECOMMENDED MAKE-UP TORQUE

O.D. In. mm	Nominal Weight lb/ft.	kg/m	Grade	Torque ft-lb—kg-m Minimum		Optimum		Maximum	
5-1/2 139.7	15.5	23.06	K-55 C-75 N-80 C-90 C-95 P-110	5100	700	5800	800	7200	1000
	17.0	25.30	K-55	5100	700	5800	800	7200	1000
			C-75 N-80	5800	800	6500	900	8000	1100
			C-90 C-95 P-110	6200	850	6900	950	8300	1150
	20.0, 23.0	29.76, 34.22	K-55 C-75 N-80 C-90 C-95 P-110	7200	1000	8000	1100	9400	1300
6-5/8 168.3	20.0, 24.0	29.76, 35.71	K-55 C-75 N-80 C-90 C-95 P-110	7200	1000	8000	1100	9400	1300
	28.0	41.66	K-55 C-75 N-80 C-90 C-95 P-110	8000	1100	8700	1200	10100	1400
	32.0	47.62	K-55 C-75 N-80 C-90 C-95 P-110	8700	1200	9400	1300	10800	1500
7 177.8	23.0	34.22	All	6500	900	7200	1000	8700	1200
	26.0	38.64	All	7200	1000	8000	1100	9400	1300
	29.0 32.0	43.15 47.62	All	8000	1100	8700	1200	10100	1400
	35.0	52.07	All	9400	1300	10100	1400	11500	1600
	38.0 41.0	56.54 61.00	All	10100	1400	10800	1500	12200	1700
	44.0	65.46	All	11500	1600	12200	1700	13600	1900
7-5/8 193.7	26.4	39.28	All	6500	900	7200	1000	8700	1200
	29.7	44.19	All	7200	1000	8000	1100	9400	1300
	37.7	56.10	All	8000	1100	8700	1200	10100	1400
	39.0	58.03	All	9400	1300	10100	1400	11500	1600
8-5/8 219.1	28.0	41.66	All	6500	900	7200	1000	8700	1200
	32.0	47.61	All	8000	1100	8700	1200	10100	1400
	36.0	53.56	All	9400	1300	10100	1400	11500	1600
	40.0	59.51	All	10100	1400	10800	1500	12200	1700
	44.0	65.47	All	11500	1600	12200	1700	13600	1900
	49.0	72.91	All	12200	1700	12900	1800	14500	2000

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VALLOUREC VAM
RECOMMENDED MAKE-UP TORQUE

O.D. In. mm	Nominal Weight lb/ft. - kg/m		Grade	Torque ft-lb—kg-m					
				Minimum		Optimum		Maximum	
9-5/8	36.0	**53.57**	All	7200	**1000**	8000	**1100**	9400	**1300**
244.5	40.0	**59.51**	All	8300	**1150**	9000	**1250**	10400	**1450**
	43.5	**64.73**	All	9400	**1300**	10100	**1400**	11500	**1600**
	47.0, 53.5	**69.93, 79.60**	All	10800	**1500**	11500	**1600**	12900	**1800**
	58.4, 61.1	**86.90, 90.92**	All	12900	**1800**	13600	**1900**	15200	**2100**
	71.8	**106.92**	All	14500	**2000**	15200	**2100**	16600	**2300**
10-3/4	40.5	**60.26**	All	8000	**1100**	8700	**1200**	10100	**1400**
273	45.5	**67.70**	All	8300	**1150**	9000	**1250**	10400	**1450**
	51.0	**75.88**	All	9400	**1300**	10100	**1400**	11500	**1600**
	55.5	**82.58**	All	10800	**1500**	11500	**1600**	12900	**1800**
	60.7	**90.31**	All	11500	**1600**	12200	**1700**	13600	**1900**
	65.7	**97.75**	All	12200	**1700**	12900	**1800**	14500	**2000**
	71.1	**105.78**	All	12900	**1800**	13600	**1900**	15200	**2100**
	76.0	**113.07**	All	13600	**1900**	14500	**2000**	15900	**2200**
	81.0	**120.51**	All	14500	**2000**	15200	**2100**	16600	**2300**
13-3/8	54.5, 61.0	**81.10, 90.77**	All	9400	**1300**	10100	**1400**	11500	**1600**
339.7	68.0, 72.0	**101.18, 107.14**	All	10100	**1400**	10800	**1500**	12200	**1700**

Note: Above values based on use of API modified thread lubricant. Correction factors for other thread lubricants are: Bakerseal 0.60; Jet Lube SS30 1.15; Bakerlok 1.60; Jet Lube TF258 0.80; Kopr Kote 0.85; Gelokote T 7.285 0.70; Liquid O-Ring 0.70; Molykote HSC 1.20

Torque values given are for Standard or Regular Couplings and should be modified if Special Clearance Couplings or Heavy Weight Couplings are used.

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FIELD INSPECTION OF NEW CASING, TUBING, AND PLAIN-END DRILL PIPE

DRIFT INFORMATION FOR CASING

Outside Diameter In.	Nominal Weight T.& C. lb/ft.	Inside Diameter In.	Drift Diameter In.		
				Extreme-Line	
			T.& C.	Finish Bored Members	Full Length Drifting
4-1/2	9.50	4.090	3.965		
	10.50	4.052	3.927		
	11.60	4.000	3.875		
	13.50	3.920	3.795		
	15.10	3.826	3.701		
5	11.50	4.560	4.435		
	13.00	4.494	4.369		
	15.00	4.408	4.283	4.183	4.151
	18.00	4.276	4.151	4.183	4.151
	21.40	4.126	4.001		
	24.10	4.000	3.875		
5-1/2	14.00	5.012	4.887		
	15.50	4.950	4.825	4.721	4.653
	17.00	4.892	4.767	4.686	4.653
	20.00	4.778	4.653	4.686	4.653
	23.00	4.670	4.545	4.595	4.545

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FIELD INSPECTION OF NEW CASING, TUBING, AND PLAIN-END DRILL PIPE

DRIFT INFORMATION FOR CASING

Outside Diameter In.	Nominal Weight T.& C. lb/ft.	Inside Diameter In.	Drift Diameter In.		
				Extreme-Line	
			T.& C.	Finish Bored Members	Full Length Drifting
6-5/8	20.00	6.049	5.924		
	24.00	5.921	5.796	5.766	5.730
	28.00	5.791	5.666	5.716	5.666
	32.00	5.675	5.550	5.600	5.550
7	17.00	6.538	6.413		
	20.00	6.456	6.331		
	23.00	6.366	6.241	6.156	6.151
	26.00	6.276	6.151	6.156	6.151
	29.00	6.184	6.059	6.108	6.059
	32.00	6.094	5.969	6.017	5.969
	35.00	6.004	5.879	5.925	5.879
	38.00	5.920	5.795	5.845	5.795
7-5/8	24.00	7.025	6.900		
	26.40	6.969	6.844	6.755	6.750
	29.70	6.875	6.750	6.755	6.750
	33.70	6.765	6.640	6.690	6.640
	39.00	6.625	6.500	6.550	6.500
	42.80	6.501	6.376		
	47.10	6.375	6.250		
8-5/8	24.00	8.097	7.972		
	28.00	8.017	7.892		
	32.00	7.921	7.796	7.710	7.700
	36.00	7.825	7.700	7.710	7.700
	40.00	7.725	7.600	7.648	7.600
	44.00	7.625	7.500	7.550	7.500
	49.00	7.511	7.386	7.436	7.386
9-5/8	32.30	9.001	8.845		
	36.00	8.921	8.765		
	40.00	8.835	8.679	8.650	8.599
	43.50	8.755	8.599	8.650	8.599
	47.00	8.681	8.525	8.606	8.525
	53.50	8.535	8.379	8.460	8.379

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FIELD INSPECTION OF NEW CASING, TUBING, AND PLAIN-END DRILL PIPE

DRIFT INFORMATION FOR CASING

Outside Diameter In.	Nominal Weight T.& C. lb/ft.	Inside Diameter In.	Drift Diameter in.		
				Extreme-Line	
			T.& C.	Finish Bored Members	Full Length Drifting
10-3/4	32.75	10.192	10.036		
	40.50	10.050	9.894		
	45.50	9.950	9.794	9.804	9.794
	51.00	9.850	9.694	9.704	9.694
	55.50	9.760	9.604	9.614	9.604
	60.70	9.660	9.504	9.514	9.504
	65.70	9.560	9.404		
11-3/4	42.00	11.084	10.928		
	47.00	11.000	10.844		
	54.00	10.880	10.724		
	60.00	10.772	10.616		
13-3/8	48.00	12.715	12.559		
	54.50	12.615	12.459		
	61.00	12.515	12.359		
	68.00	12.415	12.259		
	72.00	12.347	12.191		
16	65.00	15.250	15.062		
	75.00	15.124	14.936		
	84.00	15.010	14.822		
18-5/8	87.50	17.755	17.567		
20	94.00	19.124	18.936		
	106.50	19.000	18.812		
	133.00	18.730	18.542		

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FIELD INSPECTION OF NEW CASING, TUBING, AND PLAIN-END DRILL PIPE

DRIFT SIZES FOR BARE AND COATED CASING

Outside Diameter	Pipe		API Drift (bare pipe)		Plastic Drift For Coated Pipe	
	Lb. Per ft.	I.D.	O.D.	Length	Thin Film Drift* Size	Thick Film Drift* Size
4-1/2	9.50	4.090	3.965	6	3.945	3.930
4-1/2	10.50	4.052	3.927	6	3.907	3.892
4-1/2	11.60	4.000	3.875	6	3.855	3.840
4-1/2	13.50	3.920	3.795	6	3.775	3.760
4-1/2	15.10	3.826	3.701	6	3.681	3.666
5	11.50	4.560	4.435	6	4.415	4.400
5	13.00	4.494	4.369	6	4.349	4.334
5	15.00	4.408	4.283	6	4.263	4.248
5	18.00	4.276	4.151	6	4.131	4.116
5	21.40	4.126	4.001	6	3.981	3.966
5	24.10	4.000	3.875	6	3.855	3.840
5-1/2	14.00	5.012	4.887	6	4.867	4.852
5-1/2	15.50	4.950	4.825	6	4.805	4.790
5-1/2	17.00	4.892	4.767	6	4.747	4.732
5-1/2	20.00	4.778	4.653	6	4.633	4.618
5-1/2	23.00	4.670	4.545	6	4.525	4.510

* Tolerance for plastic drifts, plus 0.000, minus 0.010 inches.

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ALUMINUM LINER SIZES AND CAPACITIES

Size O.D. Inches	Weight Per Lin.Ft.	I.D.	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft.	Barrels Per Lin. Ft.	Lin. Ft. Per Barrel	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	*Sacks Per Lin. Ft.	*Lin. Ft. Per Sack	Size O.D. Inches
2-7/8	2.65	2.323	.0294	33.9762	.0052	190.7620	.2202	4.5420	.0251	39.7521	2-7/8
3-1/2	3.55	2.900	.0459	21.8010	.0082	122.4036	.3431	2.9144	.0392	25.5072	3-1/2
4	4.35	3.364	.0617	16.2017	.0110	90.9658	.4617	2.1659	.0527	18.9560	4
4-1/2	5.18	3.826	.0798	12.5251	.0142	70.3235	.5972	1.6744	.0682	14.6544	4-1/2
4-3/4	5.41	4.082	.0909	11.0034	.0162	61.7795	.6798	1.4709	.0776	12.8740	4-3/4
5	6.08	4.290	.1004	9.9623	.0179	55.9340	.7509	1.3318	.0857	11.6558	5
5-1/2	6.80	4.778	.1245	8.0312	.0222	45.0918	.9314	1.0736	.1064	9.3965	5-1/2
5-3/4	7.43	5.000	.1364	7.3339	.0243	41.1766	1.0200	.9804	.1165	8.5806	5-3/4
6-5/8	10.00	5.761	.1810	5.5243	.0322	31.0166	1.3541	.7385	.1547	6.4634	6-5/8
7	10.25	6.154	.2066	4.8413	.0368	27.1816	1.5452	.6472	.1705	5.6643	7
8-5/8	14.50	7.651	.3193	3.1321	.0569	17.5855	2.3883	.4187	.2728	3.6646	8-5/8

***NOTE:** If bentonite is used in the slurry, figures in the "SACKS PER LIN. FT." and "LIN. FT. PER SACK" columns would be different.

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API PLAIN END LINER SIZES AND CAPACITIES

Size O.D. Inches	Weight Per Lin. Ft.	I.D.	Cu. Ft. Per Lin. Ft.	Lin. Ft. Per Cu. Ft	Barrels Per Lin. Ft.	Lin. Ft. Per Barrel	Gallons Per Lin. Ft.	Lin. Ft. Per Gallon	*Sacks Per Lin. Ft.	*Lin. Ft. Per Sack	Size O.D. Inches
3-1/2	9.91	2.922	.0466	21.4740	.0083	120.5674	.3484	2.8707	.0398	25.1245	3-1/2
4	11.34	3.428	.0641	15.6024	.0114	87.6009	.4794	2.0857	.0547	18.2548	4
4-1/2	13.04	3.920	.0838	11.9316	.0149	66.9912	.6269	1.5950	.0716	13.9600	4-1/2
5	17.93	4.276	.0997	10.0276	.0178	56.3008	.7480	1.3405	.0852	11.7323	5
5-1/2	19.81	4.778	.1245	8.0312	.0222	45.0918	.9314	1.0736	.1064	9.3965	5-1/2
6-5/8	27.65	5.791	.1829	5.4672	.0326	30.6961	1.3683	.7309	.1563	6.3966	6-5/8

*NOTE: If bentonite is used in the slurry, figures in the "SACKS PER LIN. FT." and "LIN. FT. PER SACK" columns would be different.

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1997 Casing Reference Tables

World Oil's casing reference tables provide information on premium casing connection dimensions, available steel grades and miminum joint tension strengths. These tables are organized by connnection manufacturing company name, and listings are accompanied by cut-away diagrams (not to scale) for visual cross reference with tabular data. Coupling type and sealing mechanism follow manufacturer and coupling name or designation. Critical tubular and connection areas can be used with minimum yield or ultimate strengths in designs and to calculate casing coupling tensile capacity.

These tables are intended as a guide when planning casing programs. However, individual manufacturer representatives should be consulted before making final decisions.

CENTRON International Inc.
- DH8C Casing
- DHC Casing
- DHCC Casing
- DHHC Casing

Dalmine Spa
- Antares
- Antares MS
- Antares MS 28

EQUIVALENT S.A.
- ATS-I

GB Tubulars, Inc.
- GB TCC BUTTRESS
- GB TCC 3P

Grant Prideco
- Atlas Bradford BTB
- Atlas Bradford FL-4S
- Atlas Bradford HD-L
- Atlas Bradford NJO
- Atlas Bradford Big NJO
- Atlas Bradford SB (Special Bore)
- Atlas Bradford ST-L
- Atlas Bradford TC-II

HSC Corporation
- HSC

Hunting Interlock, Inc.
- BIG "O" SEAL-LOCK
- CONVERTABLE 8 ROUND
- CONVERTABLE BUTTRESS
- FJ-150
- FLUSH SEAL-LOCK
- FS-150
- MMS 8 ROUND
- SEAL-LOCK APEX
- SEAL-LOCK BOSS
- SEAL-LOCK HC
- TKC 8 ROUND
- TKC BUTTRESS

Hydril
- MAC-II
- Series 500 Type 511
- Series 500 Type 521
- Series 500 Type 533
- Series 500 Type 563 Casing
- SuPreme LX

Kawasaki Steel/Hunting Oilfield Services
- Fox

Mannesmann
- Big Omega
- Autocon
- BDS
- HPC
- MAT
- Mid Omega
- MUST
- PRC

Nippon Steel Corp.
- NS-CC
- NS-CC-K1
- NS-CC-FGL
- NS-HC

NKK Corp.
- NK 3SB
- NK FJ2 Liner
- NK HW

Siderca S.A.I.C.
- SEC-ST, FR & GR

Smith Fiberglass Products, Inc.
- SDT 1010
- SDT 1510

Star Fiber Glass Systems, Inc.
- ACT Coupled
- ACT Integral

TPS Technitube Röhrenwerke
- TPS-Multiseal-TS-4
- Techniseal

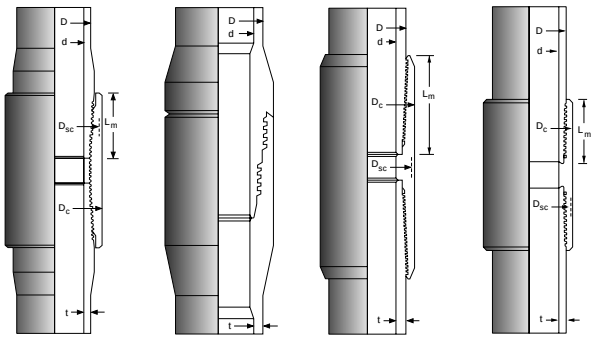
Tubular Fiberglass Corp.
- RED BOX

VAM Group (Sumitomo Metal Industries, Ltd./Tubular Industries Scotland Ltd./Vallourec Oil & Gas/VAM PTS)
- DINO VAM
- NEW VAM
- VAM ACE
- VAM FJL
- VAM HW
- VAM PRO
- VAM SL
- VAM SLIJ
- VAM TOP/VAM TOP HT

XL Systems, Inc.
- XLF
- XLC

Dimension nomenclature

D = Casing nominal tube OD, in.
w = Casing weight, lb/ft
d = ID (drift), in.
t = Casing wall thickness, in.
D_c = Connection OD, in.
D_{sc} = Connection OD (special clearance or turned down), in.
A_t = Casing wall critical cross-sectional area, sq. in.
A_c = Connection critical cross-sectional area, sq. in.
L_m = Make-up loss, in.



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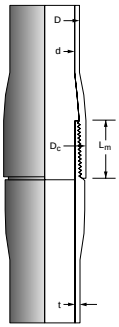
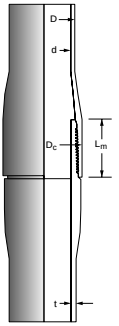
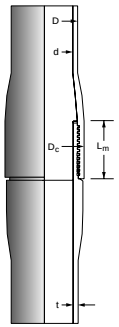


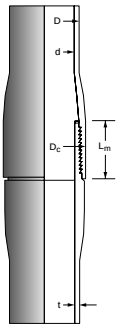
DH8C



DHC



DHCC



DHHC

CENTRON International Inc. casing is available in two joining systems. Centron's premium 4-thread-per-inch connectors feature coarse, shallow-angle thread forms that are rugged and more resistant to stab damage and cross threading. They feature O-ring seals that prevent fluid penetration into the thead seal area and keep dope in place. Excess dope is prevented from entering the formation in injection applications, thus minimizing the need for acidizing.

Centron's "8" designation indicates the industry standard; API 8rd threads. Tubing threads are EUE long form and casing threads are LTC. Both thread forms are available in Centron's patented non-galling female composite thread, assuring easy make up and superior breakout performance. Both systems can be run with common oil field tools, including pipe wrenches and power tongs.

CENTRON International Inc.—DH8C Casing

Type: Upset, integral		Seal Threaded							Minimum tube tension strength, kips	
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Rating	Ultimate
6.50	3.52	6.10	0.200	8.10	....	....	....	4.50	18.0	47.0
6.60	4.50	6.10	0.250	8.20	....	....	....	4.50	22.0	59.0
6.70	5.40	6.10	0.300	8.35	....	....	....	4.50	27.0	72.0
6.80	6.50	6.10	0.350	8.50	....	....	....	4.50	32.0	85.0
6.90	7.35	6.10	0.400	8.65	....	....	....	4.50	37.0	95.0
7.00	8.40	6.10	0.450	8.80	....	....	....	4.50	42.0	111.0
7.10	9.30	6.10	0.500	8.95	....	....	....	4.50	48.0	120.0
8.92	6.10	8.42	0.250	10.10	....	....	....	5.25	30.0	78.0
9.02	7.45	8.42	0.300	10.25	....	....	....	5.25	37.0	95.0
9.12	8.70	8.42	0.350	10.40	....	....	....	5.25	44.0	114.0
9.22	9.95	8.42	0.400	10.55	....	....	....	5.25	50.0	130.0
9.32	11.25	8.42	0.450	10.70	....	....	....	5.25	57.0	148.0
9.42	12.60	8.42	0.500	10.90	....	....	....	5.25	64.0	165.0

CENTRON International Inc.—DHC Casing

Type: Upset, integral		Seal: Resilient							Minimum tube tension strength, kips	
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Rating	Ultimate
5.15	2.10	4.85	0.150	6.30	....	....	....	4.50	10.0	28.0
5.20	2.45	4.85	0.175	6.35	....	....	....	4.50	13.0	32.0
5.25	2.85	4.85	0.200	6.40	....	....	....	4.50	14.0	38.0
5.35	3.60	4.85	0.250	6.50	....	....	....	4.50	18.0	48.0
5.45	4.40	4.85	0.300	6.60	....	....	....	4.50	22.0	58.0
5.55	5.15	4.85	0.350	6.70	....	....	....	4.50	26.0	68.0
5.65	5.90	4.85	0.400	6.80	....	....	....	4.50	30.0	78.0
6.80	3.75	6.40	0.200	8.10	....	....	....	4.50	19.0	49.0
6.90	4.75	6.40	0.250	8.20	....	....	....	4.50	24.0	60.0
7.00	5.70	6.40	0.300	8.35	....	....	....	4.50	29.0	74.0
7.10	7.60	6.40	0.350	8.40	....	....	....	4.50	34.0	86.0
7.20	7.70	6.40	0.400	8.45	....	....	....	4.50	39.0	100.0
7.30	8.65	6.40	0.450	8.55	....	....	....	4.50	44.0	115.0
7.40	9.65	6.40	0.500	8.65	....	....	....	4.50	50.0	128.0

CENTRON International Inc.—DHCC Casing

Type: Upset, integral		Seal: Resilient							Minimum tube tension strength, kips	
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Rating	Ultimate
4.63	1.90	4.33	0.150	5.25	....	....	....	4.50	9.5	25.0
4.68	2.20	4.33	0.175	5.40	....	....	....	4.50	11.0	29.0
4.73	2.53	4.33	0.200	5.50	....	....	....	4.50	13.0	34.0
4.83	3.20	4.33	0.250	5.60	....	....	....	4.50	16.0	43.0
4.93	3.61	4.33	0.280	5.75	....	....	....	4.50	18.0	48.0

CENTRON International Inc.—DHHC Casing

Type: Upset, integral		Seal: Resilient							Minimum tube tension strength, kips	
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Rating	Ultimate
6.50	3.52	6.10	0.200	8.10	....	....	....	6.00	18.0	47.0
6.60	4.50	6.10	0.250	8.20	....	....	....	6.00	22.0	59.0
6.70	5.40	6.10	0.300	8.35	....	....	....	6.00	27.0	72.0
6.80	6.50	6.10	0.350	8.50	....	....	....	6.00	32.0	85.0
6.90	7.35	6.10	0.400	8.65	....	....	....	6.00	37.0	95.0
7.00	8.40	6.10	0.450	8.80	....	....	....	6.00	42.0	111.0
7.10	9.30	6.10	0.500	8.90	....	....	....	6.00	48.0	120.0
8.92	6.10	8.42	0.250	10.10	....	....	....	6.00	30.0	78.0
9.02	7.45	8.42	0.300	10.25	....	....	....	6.00	37.0	95.0
9.12	8.70	8.42	0.350	10.40	....	....	....	6.00	44.0	114.0
9.22	9.95	8.42	0.400	10.55	....	....	....	6.00	50.0	130.0
9.32	11.25	8.42	0.450	10.70	....	....	....	6.00	57.0	148.0
9.42	12.60	8.42	0.500	10.90	....	....	....	6.00	64.0	165.0

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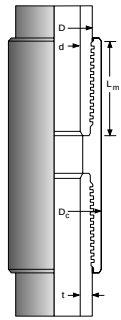
Dalmine Spa—ANTARES

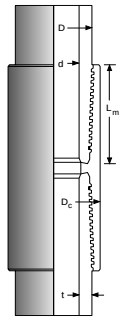
Type: Coupled **Seal: Threaded**

										Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m		H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
7.000	23.0	6.241	0.317	7.657	7.375	6.655	9.517	4.409	....	432	521	565	588	605	636	752	823	....
7.000	26.0	6.151	0.362	7.657	7.375	7.549	9.517	4.409	....	490	592	641	667	687	722	853	934	....
7.000	29.0	6.059	0.408	7.657	7.375	8.449	9.517	4.409	....	548	662	718	746	768	808	955	1045	....
7.000	32.0	5.969	0.453	7.657	7.375	9.317	9.517	4.409	....	605	730	791	823	847	891	1053	1152	....
7.000	35.0	5.879	0.498	7.657	7.375	10.172	9.517*	4.409	....	660	797	859	898	904	949	1130	1221	....
7.000	38.0	5.795	0.540	7.657	7.375	10.959	9.517*	4.409	....	678	859	859	904	904	949	1130	1221	....
7.625	26.4	6.844	0.328	8.500	8.125	7.519	13.409	4.606	....	483	581	635	659	681	716	845	926	....
7.625	29.7	6.750	0.375	8.500	8.125	8.541	13.409	4.606	....	549	660	721	749	773	813	960	1052	....
7.625	33.7	6.640	0.430	8.500	8.125	9.720	13.409	4.606	....	625	751	820	852	880	925	1093	1197	....
7.625	39.0	6.500	0.500	8.500	8.125	11.192	13.409	4.606	....	720	864	945	981	1013	1065	1258	1379	....
7.625	42.8	6.376	0.562	8.500	8.125	12.470	13.409	4.606	....	802	963	1053	1093	1129	1187	1402	1536	....
7.625	45.3	6.310	0.595	8.500	8.125	13.141	13.409	4.606	....	845	1015	1109	1152	1189	1251	1477	1619	....
7.625	47.1	6.250	0.625	8.500	8.125	13.744	13.409*	4.606	....	884	1062	1160	1205	1244	1308	1545	1693	....
7.750	46.1	6.435	0.595	8.626	(1)	13.374	13.638	4.606	....	858	1030	1127	1170	1209	1272	1502	1646	....
8.625	28.0	7.892	0.304	9.626	9.125	7.947	17.118	4.724	....	503	599	664	688	714	751	886	973	....
8.625	32.0	7.796	0.352	9.626	9.125	9.149	17.118	4.724	....	579	690	764	792	822	864	1020	1120	....
8.625	36.0	7.700	0.400	9.626	9.125	10.336	17.118	4.724	....	654	780	864	895	928	976	1152	1265	....
8.625	40.0	7.600	0.450	9.626	9.125	11.557	17.118	4.724	....	732	872	966	1001	1038	1092	1288	1415	....
8.625	44.0	7.500	0.500	9.626	9.125	12.763	17.118	4.724	....	808	963	1066	1105	1146	1206	1423	1562	....
8.625	49.0	7.386	0.557	9.626	9.125	14.118	17.118	4.724	....	894	1065	1180	1222	1268	1334	1574	1728	....
8.625	54.0	7.250	0.625	9.626	9.125	15.708	17.118	4.724	....	994	1185	1312	1360	1411	1484	1751	1923	....
8.625	58.7	7.126	0.687	9.626	9.125	17.132	17.118*	4.724	....	1085	1292	1431	1483	1539	1619	1910	2097	....
9.625	36.0	8.765	0.352	10.626	10.125	10.254	19.015	4.724	....	639	755	848	877	914	962	1133	1247	....
9.625	40.0	8.679	0.395	10.626	10.125	11.454	19.015	4.724	....	714	843	947	979	1021	1074	1266	1393	....
9.625	43.5	8.599	0.435	10.626	10.125	12.559	19.015	4.724	....	783	925	1038	1074	1119	1178	1388	1527	....
9.625	47.0	8.525	0.472	10.626	10.125	13.572	19.015	4.724	....	846	999	1122	1161	1210	1273	1500	1650	....
9.625	53.5	8.379	0.545	10.626	10.125	15.546	19.015	4.724	....	969	1145	1285	1329	1386	1458	1718	1890	....
9.625	58.4	8.435	0.595	10.626	10.125	16.879	19.015	4.724	....	1052	1243	1396	1443	1504	1583	1865	2052	....
9.625	59.4	8.407	0.609	10.626	10.125	17.250	19.015	4.724	....	1075	1270	1426	1475	1538	1618	1906	2098	....
9.625	64.9	8.281	0.672	10.626	10.125	18.901	19.015	4.724	....	1178	1392	1563	1616	1685	1772	2089	2298	....
9.875	62.6	8.469	0.625	10.827	(1)	18.162	18.581	4.724	....	1127	1329	1498	1548	1616	1700	2003	2205	....
10.750	40.5	9.894	0.350	11.752	11.250	11.435	21.078	4.724	....	700	819	934	964	1010	1063	1251	1380	....
10.750	45.5	9.794	0.400	11.748	11.250	13.006	21.051	4.724	....	796	931	1063	1097	1149	1209	1423	1570	....
10.750	51.0	9.694	0.450	11.748	11.250	14.561	21.051	4.724	....	891	1043	1190	1228	1287	1354	1594	1758	....
10.750	55.5	9.604	0.495	11.748	11.250	15.947	21.051	4.724	....	976	1142	1303	1345	1409	1483	1745	1925	....
10.750	60.7	9.504	0.545	11.748	11.250	17.473	21.051	4.724	....	1070	1251	1428	1473	1544	1625	1912	2109	....
10.750	65.7	9.404	0.595	11.748	11.250	18.982	21.051	4.724	....	1162	1359	1551	1600	1677	1765	2077	2291	....
11.750	47.0	10.844	0.375	12.752	(1)	13.401	22.969	4.724	....	807	935	1084	1116	1175	1237	1454	1607	....
11.750	54.0	10.724	0.435	12.752	(1)	15.463	22.969	4.724	....	931	1079	1250	1287	1356	1427	1677	1854	....
11.750	60.0	10.616	0.489	12.752	(1)	17.300	22.969	4.724	....	1042	1208	1399	1440	1517	1596	1877	2074	....
11.750	65.0	10.526	0.534	12.752	(1)	18.816	22.969	4.724	....	1133	1313	1521	1566	1650	1736	2041	2256	....
13.375	54.5	12.459	0.380	14.374	(1)	15.513	26.091	4.724	....	909	1037	1233	1265	1343	1414	1659	1840	....
13.375	61.0	12.359	0.430	14.374	(1)	17.487	26.091	4.724	....	1025	1169	1389	1426	1514	1594	1870	2074	....
13.375	68.0	12.259	0.480	14.374	(1)	19.445	26.091	4.724	....	1140	1300	1545	1585	1683	1772	2079	2306	....
13.375	72.0	12.191	0.514	14.374	(1)	20.768	26.091	4.724	....	1218	1389	1650	1693	1798	1893	2221	2463	....
13.500	80.4	12.161	0.576	14.500	(1)	23.387	26.330	4.724	....	1368	1559	1856	1903	2022	2129	2498	2772	....
14.000	82.5	12.689	0.562	15.000	(1)	23.726	30.597	4.724	....	1376	1560	1872	1918	2043	2152	2523	....	....
14.000	94.8	12.501	0.656	15.000	(1)	27.500	30.597	4.724	....	1595	1808	2170	2224	2368	2494	2924	....	....
14.000	99.3	12.437	0.688	15.000	(1)	28.773	30.597	4.724	....	1669	1892	2271	2326	2478	2609	3060	....	....
14.000	110.0	12.269	0.772	15.000	(1)	32.082	30.597*	4.724	....	1861	2109	2532	2594	2763	2910	3411	....	....
14.000	111.0	12.255	0.779	15.000	(1)	32.356	30.597*	4.724	....	1877	2127	2554	2616	2787	2934	3441	....	....
16.000	75.0	14.937	0.438	17.000	(1)	21.414	33.356	4.232	....	1200	1331	....	1686	....	....	....	....	....
16.000	84.0	14.823	0.495	17.000	(1)	24.112	34.870	4.724	....	1351	1499	....	1898	....	....	....	....	....
16.000	94.5	14.689	0.562	17.000	(1)	27.257	34.870	4.724	....	1527	1694	....	2146	....	....	....	....	....
16.000	109.0	14.501	0.656	17.000	(1)	31.622	34.870	4.724	....	1772	1965	....	2489	....	....	....	....	....
18.625	87.5	17.568	0.435	20.000	(1)	24.858	50.353	4.232	....	1329	1427	....	1887	....	....	....	....	....
18.625	94.5	17.502	0.468	20.000	(1)	26.696	50.353	4.232	....	1427	1533	....	2027	....	....	....	....	....
18.625	96.5	17.468	0.485	20.000	(1)	27.639	50.353	4.232	....	1477	1587	....	2099	....	....	....	....	....
18.625	99.0	17.438	0.500	20.000	(1)	28.471	52.120	4.724	....	1522	1635	....	2162	....	....	....	....	....
18.625	115.0	17.250	0.594	20.000	(1)	33.648	52.120	4.724	....	1798	1932	....	2555	....	....	....	....	....
18.625	126.0	17.166	0.636	20.000	(1)	35.943	52.120	4.724	....	1921	2064	....	2729	....	....	....	....	....
18.625	126.0	17.052	0.693	20.000	(1)	39.040	52.120	4.724	....	2086	2242	....	2964	....	....	....	....	....
20.000	94.0	18.937	0.438	21.000	(1)	26.918	41.515	4.232	....	1402	1479	....	2005	....	....	....	....	....
20.000	106.5	18.813	0.500	21.000	(1)	30.631	43.416	4.724	....	1596	1683	....	2281	....	....	....	....	....
20.000	118.5	18.687	0.563	21.000	(1)	34.379	43.416	4.724	....	1791	1889	....	2560	....	....	....	....	....
20.000	133.0	18.543	0.635	21.000	(1)	38.631	43.416	4.724	....	2012	2123	....	2877	....	....	....	....	....
20.000	147.0	18.395	0.709	21.000	(1)	42.969	43.416	4.724	....	2238	2361	....	3200	....	....	....	....	....
20.000	169.0	18.189	0.812	21.000	(1)	48.948	43.416*	4.724	....	2550	2689	....	3645	....	....	....	....	....
24.500	133.0	23.313	0.500	25.591	(1)	37.699	54.329	4.232	....	1796	1766	....	....	....	....	....	....	....
24.500	140.0	23.251	0.531	25.591	(1)	39.985	56.665	4.724	....	1905	1873	....	....	....	....	....	....	....
24.500	162.0	23.063	0.625	25.591	(1)	46.878	56.665	4.724	....	2234	2196	....	....	....	....	....	....	....
24.500	165.0	22.980	0.635	25.591	(1)	47.609	56.665	4.724	....	2269	2230	....	....	....	....	....	....	....

(1) Special clearance couplings are available. Contact Dalmine for torque data.
* Coupling with matched strength available. Higher steel grades are available upon inquiry.



DALMINE ANTARES high-performance connection is designed as an improved alternative to the traditional API buttress. Advantages include easy stabbing due to the fast taper and quicker make-up because of low-pitch thread design. Coupling and pin member are designed with a large torque shoulder to incorporate a positive torque stop and recess-free bore.



DALMINE ANTARES MS (metal seal) is an improved metal-to-metal seal connection that outperforms other single metal seal and API connections. Coupled connection efficiency is equivalent to the pipe body. The pin end, with a protected tapered sealing surface, is cut on the pipe body. The box end energizes the tapered sealing surface through the reverse-angle internal torque shoulder.

Dalmine Spa—ANTARES MS

Type: Coupled **Seal: Metal-to-metal**

										Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m		H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.369	0.253	5.563	5.375	3.773	5.513	4.252	....	269	341	341	358	358	376	448	484	....
5.000	15.0	4.283	0.296	5.563	5.375	4.374	5.513	4.252	....	312	395	395	416	416	436	519	561	....
5.000	18.0	4.151	0.362	5.563	5.375	5.275	5.513	4.252	....	376	476	476	501	501	526	626	677	....
5.000	21.4	4.001	0.437	5.563	5.375	6.264	5.513*	4.252	....	393	498	498	524	524	550	655	707	....
5.000	23.2	3.919	0.478	5.563	5.375	6.791	5.513*	4.252	....	393	498	498	524	524	550	655	707	....
5.000	24.1	3.875	0.500	5.563	5.375	7.069	5.513*	4.252	....	393	498	498	524	524	550	655	707	....
5.500	14.0	4.887	0.244	6.051	5.875	4.029	5.929	4.252	....	287	364	364	383	383	402	478	517	....
5.500	15.5	4.825	0.275	6.051	5.875	4.514	5.929	4.252	....	322	407	407	429	429	450	536	579	....
5.500	17.0	4.767	0.304	6.051	5.875	4.962	5.929	4.252	....	354	448	448	471	471	495	589	636	....
5.500	20.0	4.653	0.361	6.051	5.875	5.828	5.929	4.252	....	415	526	526	554	554	581	692	747	....
5.500	23.0	4.545	0.415	6.051	5.875	6.630	5.929*	4.252	....	422	535	535	563	563	591	704	760	....
5.500	26.8	4.375	0.500	6.051	5.875	7.854	5.929*	4.252	....	422	535	535	563	563	591	704	760	....
6.625	24.0	5.796	0.352	7.390	7.000	6.937	9.911	4.252	....	494	626	626	659	659	692	824	890	....
6.625	28.0	5.666	0.417	7.390	7.000	8.133	9.911	4.252	....	579	734	734	773	773	811	966	1043	....

Table continues

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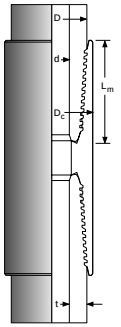
Dalmine Spa—ANTARES (continued)

										Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
6.625	32.0	5.550	0.475	7.390	7.000	9.177	9.911	4.252	....	654	828	828	872	872	915	1090	1177
7.000	20.0	6.331	0.272	7.657	7.375	5.749	9.302	4.409	....	410	519	519	546	546	573	683	737
7.000	23.0	6.241	0.317	7.657	7.375	6.655	9.302	4.409	....	474	601	601	632	632	664	790	854
7.000	26.0	6.151	0.362	7.657	7.375	7.549	9.302	4.409	....	538	681	681	717	717	753	896	968
7.000	29.0	6.059	0.408	7.657	7.375	8.449	9.302	4.409	....	602	763	763	803	803	843	1003	1084
7.000	32.0	5.969	0.453	7.657	7.375	9.317	9.302*	4.409	....	663	840	840	884	884	928	1105	1193
7.000	35.0	5.879	0.498	7.657	7.375	10.172	9.302*	4.409	....	663	840	840	884	884	928	1105	1193
7.000	38.0	5.795	0.540	7.657	7.375	10.959	9.302*	4.409	....	663	840	840	884	884	928	1105	1193
7.000	41.0	5.695	0.590	7.657	7.375	11.881	9.302*	4.409	....	663	840	840	884	884	928	1105	1193
7.625	26.4	6.844	0.328	8.500	8.125	7.519	13.158	4.606	....	536	679	679	714	714	750	893	964
7.625	29.7	6.750	0.375	8.500	8.125	8.541	13.158	4.606	....	609	771	771	811	811	852	1014	1095
7.625	33.7	6.640	0.430	8.500	8.125	9.720	13.158	4.606	....	693	877	877	923	923	970	1154	1247
7.625	39.0	6.500	0.500	8.500	8.125	11.192	13.158	4.606	....	797	1010	1010	1063	1063	1116	1329	1435
7.625	42.8	6.376	0.562	8.500	8.125	12.470	13.158	4.606	....	888	1125	1125	1185	1185	1244	1481	1599
7.625	45.3	6.310	0.595	8.500	8.125	13.141	13.158	4.606	....	936	1186	1186	1248	1248	1311	1560	1685
7.625	47.1	6.250	0.625	8.500	8.125	13.744	13.158*	4.606	....	938	1188	1188	1250	1250	1313	1563	1688
7.750	46.1	6.435	0.595	8.626	(1)	13.374	13.386	4.606	....	953	1207	1207	1271	1271	1334	1588	1715
8.625	32.0	7.796	0.352	9.626	9.125	9.149	16.830	4.724	....	652	826	826	869	869	913	1086	1173
8.625	36.0	7.700	0.400	9.626	9.125	10.336	16.830	4.724	....	736	933	933	982	982	1031	1227	1326
8.625	40.0	7.600	0.450	9.626	9.125	11.557	16.830	4.724	....	823	1043	1043	1098	1098	1153	1372	1482
8.625	44.0	7.500	0.500	9.626	9.125	12.763	16.830	4.724	....	909	1152	1152	1212	1212	1273	1516	1637
8.625	49.0	7.386	0.557	9.626	9.125	14.118	16.830	4.724	....	1006	1274	1274	1341	1341	1408	1677	1811
9.625	36.0	8.765	0.352	10.626	10.125	10.254	18.693	4.724	....	731	925	925	974	974	1023	1218	1315
9.625	40.0	8.679	0.395	10.626	10.125	11.454	18.693	4.724	....	816	1034	1034	1088	1088	1143	1360	1469
9.625	43.5	8.599	0.435	10.626	10.125	12.559	18.693	4.724	....	895	1133	1133	1193	1193	1253	1491	1611
9.625	47.0	8.525	0.472	10.626	10.125	13.572	18.693	4.724	....	967	1225	1225	1289	1289	1354	1612	1741
9.625	53.5	8.379	0.545	10.626	10.125	15.546	18.693	4.724	....	1108	1403	1403	1477	1477	1551	1846	1994
9.625	58.4	8.279	0.595	10.626	10.125	16.879	18.693	4.724	....	1203	1523	1523	1604	1604	1684	2004	2165
9.625	64.9	8.125	0.672	10.626	10.125	18.901	18.693*	4.724	....	1332	1687	1687	1776	1776	1865	2220	2397
9.875	62.8	8.469	0.625	10.827	(1)	18.162	18.350	4.724	....	1294	1639	1639	1725	1725	1812	2157	2329
9.875	68.8	8.319	0.700	10.984	(1)	20.177	21.047	4.724	....	1438	1821	1821	1917	1917	2013	2396	2588
9.875	70.4	8.305	0.707	10.984	(1)	20.363	21.047	4.724	....	1451	1838	1838	1934	1934	2031	2418	2612
9.875	72.1	8.269	0.725	10.984	(1)	20.841	21.047	4.724	....	1485	1881	1881	1980	1980	2079	2475	2673
10.750	40.5	9.894	0.350	11.748	11.250	11.435	20.719	4.724	....	815	1032	1032	1086	1086	1141	1358	1467
10.750	45.5	9.794	0.400	11.748	11.250	13.006	20.719	4.724	....	927	1174	1174	1236	1236	1297	1544	1668
10.750	51.0	9.694	0.450	11.748	11.250	14.561	20.719	4.724	....	1037	1314	1314	1383	1383	1452	1729	1867
10.750	55.5	9.604	0.495	11.748	11.250	15.947	20.719	4.724	....	1136	1439	1439	1515	1515	1591	1894	2045
10.750	60.7	9.504	0.545	11.748	11.250	17.473	20.719	4.724	....	1245	1577	1577	1660	1660	1743	2075	2241
10.750	65.7	9.404	0.595	11.748	11.250	18.982	20.719	4.724	....	1352	1713	1713	1803	1803	1893	2254	2434
11.750	47.0	10.844	0.375	12.752	(1)	13.401	22.576	4.724	....	955	1209	1209	1273	1273	1337	1591	1719
11.750	54.0	10.724	0.435	12.752	(1)	15.463	22.576	4.724	....	1102	1396	1396	1469	1469	1542	1836	1983
11.750	60.0	10.616	0.489	12.752	(1)	17.300	22.576	4.724	....	1233	1561	1561	1644	1644	1726	2054	2219
13.375	54.5	12.459	0.380	14.374	(1)	15.513	25.676	4.724	....	1105	1400	1400	1474	1474	1547	1842	1990
13.375	61.0	12.359	0.430	14.374	(1)	17.487	25.676	4.724	....	1246	1578	1578	1661	1661	1744	2077	2243
13.375	68.0	12.259	0.480	14.374	(1)	19.445	25.676	4.724	....	1385	1755	1755	1847	1847	1940	2309	2494
13.375	72.0	12.191	0.514	14.374	(1)	20.768	25.676	4.724	....	1480	1874	1874	1973	1973	2072	2466	2663

(1) Special clearance couplings are available. Contact Dalmine for torque data.
* Coupling with matched strength available.



DALMINE ANTARES MS 28 (metal seal) tubing connections fill the requirements of exploring for deep and sour hydrocarbons wells. It is designed for easy stabbing and make-up. Designed to withstand handling and mishandling in the field, the joint is a precision component capable of withstanding high mechanical stress while providing gas-tight sealing at full pressure rating, even in the worst possible conditions. The connection was designed from the start for use with corrosion resistant alloys (CRA).

Dalmine Spa—ANTARES MS28

Type: Coupled **Seal: Metal-to-metal**

										Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.369	0.253	5.512	5.375	3.773	5.014	4.882	....	269	341	341	358	358	376	448	484
5.000	15.0	4.283	0.296	5.512	5.375	4.374	5.014	4.882	....	312	395	395	416	416	436	519	561
5.000	18.0	4.151	0.362	5.630	5.375	5.275	6.047	4.882	....	376	476	476	501	501	526	626	677
5.000	21.4	4.001	0.437	5.756	5.375	6.264	7.173	4.882	....	446	565	565	595	595	625	744	803
5.000	23.2	3.919	0.478	5.756	5.375	6.791	7.173	4.882	....	484	613	613	645	645	677	806	871
5.000	24.1	3.875	0.500	5.756	5.375	7.069	7.173	4.882	....	504	638	638	672	672	705	839	907
5.500	15.5	4.825	0.275	6.043	5.875	4.514	5.792	4.882	....	322	407	407	429	429	450	536	579
5.500	17.0	4.767	0.304	6.043	5.875	4.962	5.792	4.882	....	354	448	448	471	471	495	589	636
5.500	20.0	4.653	0.361	6.146	5.875	5.828	6.774	4.882	....	415	526	526	554	554	581	692	747
5.500	23.0	4.545	0.415	6.146	5.875	6.630	6.774	4.882	....	472	598	598	630	630	661	787	850
5.500	26.8	4.375	0.500	6.260	5.875	7.854	7.886	4.882	....	560	709	709	746	746	783	933	1007
6.625	24.0	5.796	0.352	7.390	7.000	6.937	10.142	4.409	....	494	626	626	659	659	692	824	890
6.625	28.0	5.666	0.417	7.390	7.000	8.133	10.142	4.409	....	579	734	734	773	773	811	966	1043
6.625	32.0	5.550	0.475	7.390	7.000	9.177	10.142	4.409	....	654	828	828	872	872	915	1090	1177
7.000	23.0	6.241	0.317	7.657	7.375	6.655	9.509	4.528	....	474	601	601	632	632	664	790	854
7.000	26.0	6.151	0.362	7.657	7.375	7.549	9.509	4.528	....	538	681	681	717	717	753	896	968
7.000	29.0	6.059	0.408	7.657	7.375	8.449	9.509	4.528	....	602	763	763	803	803	843	1003	1084
7.000	32.0	5.969	0.453	7.657	7.375	9.317	9.509	4.528	....	664	841	841	885	885	929	1106	1195
7.000	35.0	5.879	0.498	7.795	7.375	10.172	11.183	4.528	....	725	918	918	966	966	1015	1208	1305
7.000	38.0	5.795	0.540	7.795	7.375	10.959	11.183	4.528	....	781	989	989	1041	1041	1093	1301	1405
7.625	26.4	6.844	0.328	8.500	8.125	7.519	13.428	4.724	....	536	679	679	714	714	750	893	964
7.625	29.7	6.750	0.375	8.500	8.125	8.541	13.428	4.724	....	609	771	771	811	811	852	1014	1095
7.625	33.7	6.640	0.430	8.500	8.125	9.720	13.428	4.724	....	693	877	877	923	923	970	1154	1247
7.625	39.0	6.500	0.500	8.500	8.125	11.192	13.428	4.724	....	797	1010	1010	1063	1063	1116	1329	1435
7.625	42.8	6.376	0.562	8.500	8.125	12.470	13.428	4.724	....	888	1125	1125	1185	1185	1244	1481	1599
7.625	45.3	6.310	0.595	8.500	8.125	13.141	13.428	4.724	....	936	1186	1186	1248	1248	1311	1560	1685
7.625	47.1	6.250	0.625	8.543	8.125	13.744	14.007	4.724	....	979	1240	1240	1306	1306	1371	1632	1763
7.750	46.1	6.435	0.595	8.626	(1)	13.374	13.594	4.724	....	953	1207	1207	1271	1271	1334	1588	1715
8.625	32.0	7.796	0.352	9.626	9.125	9.149	17.087	4.843	....	652	826	826	869	869	913	1086	1173
8.625	36.0	7.700	0.400	9.626	9.125	10.336	17.087	4.843	....	736	933	933	982	982	1031	1227	1326
8.625	40.0	7.600	0.450	9.626	9.125	11.557	17.087	4.843	....	823	1043	1043	1098	1098	1153	1372	1482
8.625	44.0	7.500	0.500	9.626	9.125	12.763	17.087	4.843	....	909	1152	1152	1212	1212	1273	1516	1637
8.625	49.0	7.386	0.557	9.626	9.125	14.118	17.087	4.843	....	1006	1274	1274	1341	1341	1408	1677	1811
9.625	36.0	8.765	0.352	10.626	10.125	10.254	18.981	4.843	....	731	925	925	974	974	1023	1218	1315
9.625	40.0	8.679	0.395	10.626	10.125	11.454	18.981	4.843	....	816	1034	1034	1088	1088	1143	1360	1469
9.625	43.5	8.599	0.435	10.626	10.125	12.559	18.981	4.843	....	895	1133	1133	1193	1193	1253	1491	1611
9.625	47.0	8.525	0.472	10.626	10.125	13.572	18.981	4.843	....	967	1225	1225	1289	1289	1354	1612	1741
9.625	53.5	8.379	0.545	10.626	10.125	15.546	18.981	4.843	....	1108	1403	1403	1477	1477	1551	1846	1994
9.625	64.9	8.125	0.672	10.650	10.125	18.901	19.377	4.843	....	1347	1706	1706	1796	1796	1885	2244	2424

(1) Special clearance couplings are available.
Contact Dalmine for torque data.

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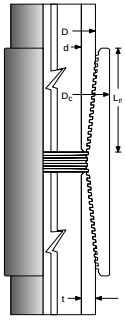
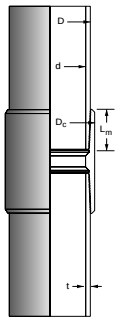


EQUIVALENT S.A. ATS-I is a threaded and coupled connection specifically designed for large diameter casing. This patented design features a hooked thread profile to eliminate jump-out failures and tightly controlled thread elements to provide a positive gas tight seal. The design philosophy includes structural analysis, finite element analysis, strain gauge correlation with full scale API 5C5 lab proof testing and field handling performance.

EQUIVALENT S.A.—ATS-I

Type: Coupled Seal: Threaded

D	w	d	t	D_c	D_{pc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
13.375	61.0	12.359	0.430	14.375	14.375	17.487	14.995	5.9	....	1125	1425	1425	1499	1499	1574	1874	2024
13.375	68.0	12.259	0.480	14.375	14.375	19.445	16.965	5.9	....	1272	1612	1612	1696	1696	1781	2121	2290
13.375	72.0	12.259	0.514	14.375	14.375	20.768	18.295	5.9	....	1372	1738	1738	1830	1830	1921	2287	2470
13.625	88.2	12.250	0.625	14.600	14.540	25.526	23.048	5.9	....	1729	2190	2190	2305	2305	2420	2881	3112
14.000	82.5	12.720	0.562	15.100	14.781	23.726	21.151	5.9	....	1586	2009	2009	2115	2115	2221	2644	2855
14.000	94.8	12.532	0.656	15.100	14.970	27.501	24.950	5.9	....	1871	2370	2370	2495	2495	2620	3119	3368
14.000	99.3	12.468	0.688	15.100	15.035	28.773	26.230	5.9	....	1967	2492	2492	2623	2623	2754	3279	3541
14.000	110.0	12.300	0.772	15.100	15.100	32.082	29.560	5.9	....	2217	2808	2808	2956	2956	3104	3695	3991
16.000	65.0	15.062	0.375	17.000	16.440	18.408	15.399	5.9	....	1155	1463	1463	1540	1540	1617	1925	2079
16.000	75.0	14.937	0.438	17.000	16.535	21.414	18.421	5.9	....	1382	1750	1750	1842	1842	1934	2303	2487
16.000	84.0	14.822	0.495	17.000	16.644	24.112	21.133	5.9	....	1585	2008	2008	2113	2113	2219	2642	2853
16.000	84.8	14.812	0.500	17.000	16.654	24.347	21.370	5.9	....	1603	2030	2030	2137	2137	2244	2671	2885
16.000	94.5	14.688	0.562	17.000	16.774	27.257	24.295	5.9	....	1822	2308	2308	2430	2430	2551	3037	3280
16.000	104.0	14.562	0.625	17.000	16.898	30.189	27.243	5.9	....	2043	2588	2588	2724	2724	2860	3405	3678
16.000	109.0	14.501	0.656	17.000	16.959	31.622	28.684	5.9	....	2151	2725	2725	2868	2868	3012	3586	3872
16.000	118.0	14.383	0.715	17.000	17.000	34.334	31.410	5.9	....	2356	2984	2984	3141	3141	3298	3926	4240
16.000	128.0	14.251	0.781	17.000	17.000	37.341	32.795	5.9	....	2460	3116	3116	3280	3280	3443	4099	4427
18.625	87.5	17.567	0.435	20.000	19.156	24.858	21.362	5.9	....	1602	2029	2029	2136	2136	2243	2670	2884
18.625	96.5	17.500	0.485	20.000	19.250	27.639	24.156	5.9	....	1812	2295	2295	2416	2416	2536	3020	3261
18.625	106.0	17.375	0.531	20.000	19.338	30.184	26.713	5.9	....	2004	2538	2538	2671	2671	2805	3339	3606
18.625	109.4	17.311	0.563	20.000	19.399	31.947	28.484	5.9	....	2136	2706	2706	2848	2848	2991	3561	3845
18.625	112.0	17.279	0.579	20.000	19.430	32.825	29.368	5.9	....	2203	2790	2790	2937	2937	3084	3671	3965
18.625	117.5	17.252	0.593	20.000	19.457	33.593	30.139	5.9	....	2260	2863	2863	3014	3014	3165	3767	4069
18.625	126.0	17.166	0.636	20.000	19.541	35.943	32.500	5.9	....	2438	3088	3088	3250	3250	3413	4063	4388
18.625	136.0	17.052	0.693	20.000	19.652	39.040	35.613	5.9	....	2671	3383	3383	3561	3561	3739	4452	4808
20.000	94.0	18.936	0.438	21.000	20.540	26.918	23.162	5.9	....	1737	2200	2200	2316	2316	2432	2895	3127
20.000	106.5	18.812	0.500	21.000	20.657	30.631	26.892	5.9	....	2017	2555	2555	2689	2689	2824	3362	3630
20.000	131.0	18.562	0.625	21.000	20.896	38.043	34.340	5.9	....	2575	3262	3262	3434	3434	3606	4292	4636
20.000	133.0	18.543	0.635	21.000	20.915	38.632	34.931	5.9	....	2620	3318	3318	3493	3493	3668	4366	4716
20.000	147.0	18.395	0.709	21.000	21.000	42.969	39.289	5.9	....	2947	3732	3732	3929	3929	4125	4911	5304
20.000	156.0	18.312	0.750	21.200	21.140	45.357	41.689	5.9	....	3127	3960	3960	4169	4169	4377	5211	5628
20.000	169.0	18.189	0.812	21.200	21.200	48.948	45.298	5.9	....	3397	4303	4303	4530	4530	4756	5662	6115
24.000	128.0	22.812	0.500	25.100	24.662	36.914	32.414	5.9	....	2431	3079	3079	3241	3241	3403	4052	4376
24.000	162.0	22.543	0.635	25.100	24.917	46.611	42.154	5.9	....	3162	4005	4005	4215	4215	4426	5269	5691
24.000	165.0	22.512	0.650	25.100	24.945	47.682	43.229	5.9	....	3242	4107	4107	4323	4323	4539	5404	5836
24.000	174.0	22.436	0.688	25.100	25.018	50.387	45.947	5.9	....	3446	4365	4365	4595	4595	4824	5743	6203
24.000	189.0	22.312	0.750	25.100	25.100	54.782	50.361	5.9	....	3777	4784	4784	5036	5036	5288	6295	6799
24.000	203.0	22.189	0.812	25.100	25.100	59.152	52.019	5.9	....	3901	4942	4942	5202	5202	5462	6502	7023



GB TUBULARS, INC. GB TCC BUTTRESS (Twin Cantilever Coupling) is a gas-tight, thread-and-coupled connection. Enhancement at the center reinforces the coupling, develops high bearing pressures in mating thread elements and provides pressure integrity exceeding pipe body ratings. It is an economical substitute for any positive type seal connection, can be special clearance without loss of pressure integrity and is ideal for directional or horizontal drilling.

GB Tubulars, Inc.—GB TCC BUTTRESS

Type: Coupled Seal: Thread interference

D	w	d	t	D_c	D_{pc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.500	17.0	4.767	0.304	6.050	5.875	4.963	6.108	4.1250	....	....	....	428	446	....	....	568	....
5.500	20.0	4.653	0.361	6.050	5.875	5.828	6.108	4.1250	....	....	....	503	524	....	....	667	728
5.500	23.0	4.545	0.415	6.050	5.875	6.630	6.108	4.1250	....	....	....	551	580	....	....	725	783
7.000	29.0	6.059	0.408	7.656	7.375	8.449	9.226	4.5000	....	....	....	718	746	....	....	955	1045
7.000	32.0	6.000	0.453	7.656	7.375	9.317	9.226	4.5000	....	....	....	791	823	....	....	1053	1152
7.000	35.0	5.879	0.498	7.656	7.375	10.172	9.226	4.5000	....	....	....	833	876	....	....	1096	1183
7.000	38.0	5.795	0.540	7.656	7.375	10.959	9.226	4.5000	....	....	....	833	876	....	....	1096	1183
7.625	29.7	6.750	0.375	8.500	8.125	8.541	13.036	4.6875	....	....	....	721	749	....	....	960	....
7.625	33.7	6.640	0.430	8.500	8.125	9.720	13.036	4.6875	....	....	....	820	852	....	....	1093	1197
7.625	39.0	6.500	0.500	8.500	8.125	11.192	13.036	4.6875	....	....	....	945	981	....	....	1258	1379
9.625	43.5	8.625	0.435	10.625	10.125	12.559	18.496	4.8125	....	....	....	....	1074	....	....	....	....
9.625	47.0	8.525	0.472	10.625	10.125	13.572	18.496	4.8125	....	....	....	1122	1161	....	....	1500	....
9.625	53.5	8.500	0.545	10.625	10.125	15.547	18.496	4.8125	....	....	....	1286	1329	....	....	1718	1890
9.875	62.8	8.500	0.625	10.625	....	18.162	18.496	4.8125	....	....	....	....	....	....	....	....	1743
10.750	45.5	9.875	0.400	11.750	11.250	13.006	20.569	4.8125	....	....	931	....	1097	....	....	....	....
10.750	51.0	9.694	0.450	11.750	11.250	14.561	20.569	4.8125	....	....	....	1190	1228	....	....	....	....
10.750	60.7	9.504	0.545	11.750	11.250	17.473	20.569	4.8125	....	....	....	....	....	....	....	1912	....
11.750	65.0	10.625	0.534	12.750	....	18.816	22.412	4.8125	....	....	....	....	....	....	....	2041	2256
11.875	71.8	10.625	0.582	12.750	....	20.648	22.412	4.8125	....	....	....	....	....	....	....	1988	2198
13.375	68.0	12.259	0.480	14.375	13.875	19.445	25.406	4.8125	....	....	1300	1545	1585	....	....	2079	....
13.375	72.0	12.250	0.514	14.375	13.875	20.768	25.406	4.8125	....	....	....	1650	1693	....	....	2221	2463
13.625	88.2	12.250	0.625	14.375	14.000	25.526	25.406	4.8125	....	....	....	....	....	....	....	2163	2399
16.000	84.0	14.822	0.495	17.000	16.500	24.112	33.190	4.8125	....	....	1499	....	1898	....	....	2518	....
16.000	97.0	14.750	0.575	17.000	16.500	27.864	33.190	4.8125	....	....	....	2194	....	....	....	2910	....
16.000	109.0	14.500	0.656	17.000	16.500	31.622	33.190	4.8125	....	....	1965	....	....	....	....	....	....
18.625	87.5	17.567	0.435	19.625	19.125	24.858	38.489	4.8125	....	....	1427	....	....	....	....	....	....
18.625	99.5	17.500	0.500	19.625	19.125	28.471	38.489	4.8125	....	....	1635	....	....	....	....	....	....
18.625	101.0	17.500	0.510	19.625	19.125	29.024	38.489	4.8125	....	....	....	....	2204	....	....	....	....
20.000	94.0	18.936	0.438	21.000	20.500	26.918	41.308	4.8125	....	....	1479	....	....	....	....	....	....
20.000	106.5	18.812	0.500	21.000	20.500	30.631	41.308	4.8125	....	....	1683	....	....	....	....	....	....
20.000	133.0	18.542	0.635	21.000	20.500	38.632	41.308	4.8125	....	....	2123	....	2877	....	....	....	....
20.000	169.0	18.188	0.812	21.000	20.500	48.948	44.487	4.8125	....	....	2689	....	....	....	....	....	....

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GB Tubulars, Inc.—GB TCC 3P

Type: Coupled Seal: Thread interference

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
16.000	84.0	14.822	0.495	17.000	16.500	24.112	32.968	4.8125	....	....	1499	....	1898	....	....	....	....
16.000	97.0	14.750	0.575	17.000	16.500	27.864	32.968	4.8125	....	....		....	2194	....	....	2910	....
16.000	109.0	14.500	0.656	17.000	16.500	31.622	32.968	4.8125	....	....	1965	....	....	....	....	....	....
18.625	87.5	17.567	0.435	19.625	19.125	24.858	38.258	4.8215	....	....	1427	....	....	....	....	....	....
18.625	99.5	17.500	0.500	19.625	19.125	28.471	38.258	4.8125	....	....	1635	....	....	....	....	....	....
18.625	101.0	17.500	0.510	19.625	19.125	29.024	38.258	4.8125	....	....		....	2204	....	....	....	....
20.000	94.0	18.936	0.438	21.000	20.500	26.918	41.029	4.8125	....	....	1479	....	....	....	....	....	....
20.000	106.5	18.812	0.500	21.000	20.500	30.631	41.029	4.8125	....	....	1683	....	....	....	....	....	....
20.000	133.0	18.542	0.635	21.000	20.500	38.632	41.029	4.8125	....	....	2123	....	2877	....	....	....	....
20.000	169.0	18.888	0.812	21.000	20.500	48.948	41.029	4.8125	....	....	2689	....	....	....	....	....	....

Grant Prideco—Atlas Bradford BTB

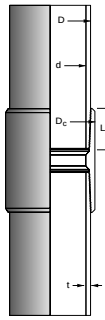
Type: Threaded, coupled Seal: Resilient

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
7.000	23.0	6.241	0.317	7.656	7.231	6.655	6.199	4.420	248	341	341	496	496	558	589	682	775
7.000	26.0	6.151	0.362	7.656	7.310	7.549	7.092	4.420	284	390	390	567	567	638	674	780	887
7.000	29.0	6.059	0.408	7.656	7.388	8.449	7.993	4.420	320	440	440	639	639	719	759	879	999
7.000	32.0	5.969	0.453	7.656	7.463	9.317	8.861	4.420	354	487	487	709	709	797	842	975	1108
7.625	26.4	6.844	0.328	8.500	7.866	7.519	7.022	4.564	281	386	386	562	562	632	667	772	878
7.625	29.7	6.750	0.375	8.500	7.949	8.541	8.044	4.564	322	442	442	643	643	724	764	885	1005
7.625	33.7	6.640	0.430	8.500	8.043	9.720	9.222	4.564	369	507	507	738	738	830	876	1014	1153
7.625	47.1	6.570	0.465	8.500	8.102	10.460	9.962	4.564	398	548	548	797	797	897	946	1096	1245
7.625	39.0	6.500	0.500	8.500	8.159	11.192	10.694	4.564	428	588	588	856	856	962	1016	1176	1337
7.750	46.1	6.435	0.595	8.500	8.159	13.374	11.584	6.064	463	637	637	927	927	1043	1100	1274	1448
8.625	28.0	7.892	0.304	9.625	8.816	7.947	7.384	4.660	295	406	406	591	591	665	701	812	923
8.625	32.0	7.796	0.352	9.625	8.903	9.149	8.586	4.660	343	472	472	687	687	773	816	944	1073
8.625	36.0	7.700	0.400	9.625	8.988	10.336	9.773	4.660	391	538	538	782	782	880	928	1075	1222
8.625	40.0	7.600	0.450	9.625	9.074	11.557	10.994	4.660	440	605	605	880	880	989	1044	1209	1374
8.625	44.0	7.500	0.500	9.625	9.159	12.763	12.200	4.660	488	671	671	976	976	1098	1159	1342	1525
9.625	43.5	8.599	0.435	10.625	10.051	12.559	11.931	4.672	477	656	656	954	954	1074	1133	1312	1491
9.625	47.0	8.525	0.472	10.625	10.115	13.572	12.944	4.672	518	712	712	1036	1036	1165	1230	1424	1618
9.625	53.5	8.379	0.545	10.625	10.209	15.546	14.918	4.672	597	820	820	1193	1193	1343	1417	1641	1865
9.875	62.8	8.469	0.625	10.625	10.321	18.162	15.322	7.661	613	843	843	1226	1226	1379	1456	1685	1915
10.750	40.5	9.894	0.350	11.750	11.026	11.435	10.733	4.648	429	590	590	859	859	966	1020	1181	1342
10.750	45.5	9.794	0.400	11.750	11.117	13.006	12.304	4.648	492	677	677	984	984	1107	1169	1353	1538
10.750	51.0	9.694	0.450	11.750	11.206	14.561	13.859	4.648	554	762	762	1109	1109	1247	1317	1525	1732
10.750	55.5	9.604	0.495	11.750	11.284	15.947	15.245	4.648	610	839	839	1220	1220	1372	1448	1677	1906
10.750	60.7	9.504	0.545	11.750	11.370	17.473	16.771	4.648	671	922	922	1342	1342	1509	1593	1845	2096
11.750	60.0	10.616	0.489	12.750	12.272	17.300	16.532	4.732	661	909	909	1323	1323	1488	1571	1819	2067
11.750	65.0	10.526	0.534	12.750	12.350	18.816	18.049	4.732	722	993	993	1444	1444	1624	1715	1985	2256
11.750	66.7	10.500	0.547	12.750	12.433	19.252	18.484	4.732	739	1017	1017	1479	1479	1664	1756	2033	2311
11.750	71.0	10.400	0.582	12.750	12.373	20.420	19.652	4.732	786	1081	1081	1572	1572	1769	1867	2162	2457
11.875	71.8	10.555	0.582	12.750	12.445	20.648	19.873	6.232	795	1093	1093	1590	1590	1789	1888	2186	2484
13.375	68.0	12.259	0.480	14.375	13.889	19.445	18.572	4.672	743	1021	1021	1486	1486	1671	1764	2043	2321
13.375	72.0	12.191	0.514	14.375	13.950	20.768	19.894	4.672	796	1094	1094	1592	1592	1790	1890	2188	2487
13.375	77.0	12.119	0.550	14.375	14.015	22.160	21.286	4.672	852	1171	1171	1703	1703	1916	2022	2341	2661
13.625	88.2	12.219	0.625	14.375	14.167	25.525	24.635	4.672	985	1355	1355	1971	1971	2217	2340	2710	3079
14.000	82.5	12.688	0.562	15.000	14.525	23.726	22.811	6.412	912	1255	1255	1825	1825	2053	2167	2509	2851
14.000	94.8	12.500	0.656	15.000	14.690	27.500	26.586	6.412	1063	1462	1462	2127	2127	2393	2526	2924	3323
14.000	99.3	12.436	0.688	15.000	14.745	28.773	27.858	6.412	1114	1532	1532	2229	2229	2507	2647	3064	3482
14.000	111.0	12.254	0.779	15.000	14.899	32.356	31.441	6.412	1258	1729	1729	2515	2515	2830	2987	3459	3930
14.000	123.0	12.068	0.872	15.000	15.053	35.964	32.493	6.412	1300	1787	1787	2599	2599	2924	3087	3574	4062
16.000	75.0	14.936	0.438	17.000	16.300	21.414	20.368	6.436	815	1120	1120	1629	1629	1833	1935	2240	2546
16.000	84.0	14.822	0.495	17.000	16.405	24.112	23.066	6.436	923	1269	1269	1845	1845	2076	2191	2537	2883
16.000	94.5	14.688	0.562	17.000	16.527	27.257	26.212	6.436	1048	1442	1442	2097	2097	2359	2490	2883	3276
16.000	109.0	14.500	0.656	17.000	16.695	31.622	30.577	6.436	1223	1682	1682	2446	2446	2752	2905	3363	3822
16.000	118.0	14.382	0.715	17.000	16.798	34.334	33.288	6.436	1332	1831	1831	2663	2663	2996	3162	3662	4161
16.000	128.0	14.250	0.781	17.000	16.912	37.341	36.296	6.436	1452	1996	1996	2904	2904	3267	3448	3993	4537
18.625	87.5	17.567	0.435	20.000	18.922	24.858	23.641	6.436	946	1300	1300	1891	1891	2128	2246	2601	2955
18.625	93.7	17.501	0.468	20.000	18.983	26.696	25.478	6.436	1019	1401	1401	2038	2038	2293	2420	2803	3185
18.625	96.5	17.467	0.485	20.000	19.015	27.639	26.422	6.436	1057	1453	1453	2114	2114	2378	2510	2906	3303
18.625	109.4	17.311	0.563	20.000	19.159	31.947	30.729	6.436	1229	1690	1690	2458	2458	2766	2919	3380	3841
18.625	112.0	17.279	0.579	20.000	19.188	32.825	31.608	6.436	1264	1738	1738	2529	2529	2845	3003	3477	3951
18.625	136.0	17.051	0.693	20.000	19.394	39.040	37.823	6.436	1513	2080	2080	3026	3026	3404	3593	4161	4728
20.000	94.0	18.936	0.438	21.000	20.297	26.918	25.611	6.460	1024	1409	1409	2049	2049	2305	2433	2817	3201
20.000	106.5	18.812	0.500	21.000	20.414	30.631	29.323	6.460	1173	1613	1613	2346	2346	2639	2786	3226	3665
20.000	117.0	18.686	0.563	21.000	20.530	34.379	33.071	6.460	1323	1819	1819	2646	2646	2976	3142	3638	4134
20.000	133.0	18.542	0.635	21.000	20.662	38.631	37.324	6.460	1493	2053	2053	2986	2986	3359	3546	4106	4666
20.000	147.0	18.394	0.709	21.000	20.795	42.969	41.661	6.460	1666	2291	2291	3333	3333	3750	3958	4583	5208
20.000	169.0	18.188	0.812	21.000	20.978	48.948	46.551	6.460	1862	2560	2560	3724	3724	4190	4422	5121	5819

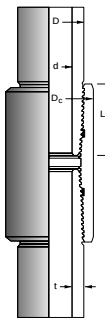
Grant Prideco—Atlas Bradford FL-4S

Type: Integral flush joint Seal: Metal-to-metal, threaded, resilient

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	11.5	4.435	0.220	5.0	....	3.304	1.370	1.652	55	75	75	110	110	123	130	151	171
5.000	13.0	4.369	0.253	5.0	....	3.773	1.958	2.059	78	108	108	157	157	176	186	215	245
5.000	15.0	4.283	0.296	5.0	....	4.374	2.298	2.139	92	126	126	184	184	207	218	253	287
5.000	18.0	4.151	0.362	5.0	....	5.275	3.310	3.815	132	182	182	265	265	298	314	364	414
5.500	14.0	4.887	0.244	5.5	....	4.029	1.676	1.757	67	92	92	134	134	151	159	184	210
5.500	15.5	4.825	0.275	5.5	....	4.514	2.356	2.098	94	130	130	188	188	212	224	259	295
5.500	17.0	4.767	0.304	5.5	....	4.962	2.607	2.148	104	143	143	209	209	235	248	287	326
5.500	20.0	4.653	0.361	5.5	....	5.828	3.669	3.825	147	202	202	294	294	330	349	404	459
5.500	23.0	4.545	0.415	5.5	....	6.630	4.193	4.164	168	231	231	335	335	377	398	461	524



GB TUBULARS, INC. GB TCC 3P (3-Pitch thread) is a large-OD threaded-and-coupled connection. It was designed using proven TCC design and a deep-stab, no-cross, 3-pitch thread. Heavy cross section provides reinforcement at coupling center to minimize distortion from make-up and combined loading for superior make/break repeatability. Like the GB TCC with the API Buttress thread, it exceeds pipe body ratings even under severe combined loading situations. Handling and running procedures for casing with this connection are the same as API BTC.



GRANT PRIDECO Atlas Bradford BTB (Better-than-buttress) provides an economical solution for Class III applications or when pressure sealing, thread performance, or running characteristics need to be better-than-buttress for a less than premium price. It uses API buttress sized coupling stock and is available in sizes 7 to 20 in. Positive sealing to API pipe body rating is ensured by resilient Teflon seal ring. Tapered thread body has a negative tensile load flank thread form providing tensile efficiencies from 94 to 96% of pipe body.

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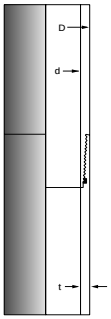
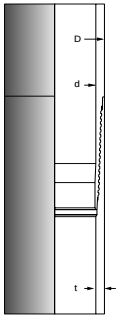


GRANT PRIDECO Atlas Bradford FL-4S is a premium quality tubing and casing connection featuring Quadraseal design with metal-to-metal pin flank seal, trapped Teflon back-up seal, tapered modified buttress thread and external shoulder with trapping angle for exclusive four-way protection against leakage. It provides high joint strength, maximum running clearance, flush OD and optimum efficiency for every wall thickness.

Grant Prideco—Atlas Bradford HD-L

Type: Integral flush joint **Seal: Metal-to-metal**

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	15.0	4.283	0.296	5.000	....	4.374	2.013	3.19	81	111	111	161	161	181	191	221	252
5.000	18.0	4.151	0.362	5.000	....	5.275	2.736	3.68	109	150	150	219	219	246	260	301	342
5.000	20.3	4.059	0.408	5.000	....	5.886	3.317	4.03	133	182	182	265	265	299	315	365	415
5.000	20.8	4.031	0.422	5.000	....	6.069	3.500	4.29	140	193	193	280	280	315	333	385	438
5.000	21.4	4.001	0.437	5.000	....	6.264	3.695	4.58	148	203	203	296	296	333	351	406	462
5.000	23.2	3.919	0.478	5.000	....	6.791	4.191	4.65	168	231	231	335	335	377	398	461	524
5.000	24.1	3.875	0.500	5.000	....	7.069	4.469	4.99	179	246	246	358	358	402	425	492	559
5.500	17.0	4.767	0.304	5.500	....	4.962	2.325	3.30	93	128	128	186	186	209	221	256	291
5.500	20.0	4.653	0.361	5.500	....	5.828	2.995	3.52	120	165	165	240	240	270	285	329	374
5.500	23.0	4.545	0.415	5.500	....	6.630	3.762	4.05	150	207	207	301	301	339	357	414	470
5.500	26.0	4.423	0.476	5.500	....	7.513	4.612	4.52	184	254	254	369	369	415	438	507	577
5.500	28.4	4.315	0.530	5.500	....	8.275	5.374	5.38	215	296	296	430	430	484	511	591	672
6.625	24.0	5.796	0.352	6.625	....	6.937	3.655	4.24	146	201	201	292	292	329	347	402	457
6.625	28.0	5.666	0.417	6.625	....	8.133	4.571	3.84	183	251	251	366	366	411	434	503	571
6.625	32.0	5.550	0.475	6.625	....	9.177	5.616	4.95	225	309	309	449	449	505	534	618	702
6.625	35.0	5.450	0.525	6.625	....	10.061	6.458	5.09	258	355	355	517	517	581	614	710	807
7.000	23.0	6.241	0.317	7.000	....	6.655	3.152	3.36	126	173	173	252	252	284	299	347	394
7.000	26.0	6.151	0.362	7.000	....	7.549	3.793	3.34	152	209	209	303	303	341	360	417	474
7.000	29.0	6.059	0.408	7.000	....	8.449	4.693	4.22	188	258	258	375	375	422	446	516	587
7.000	32.0	5.969	0.453	7.000	....	9.317	5.517	4.45	221	303	303	441	441	497	524	607	690
7.000	35.0	5.879	0.498	7.000	....	10.172	6.329	4.60	253	348	348	506	506	570	601	696	791
7.000	38.0	5.795	0.540	7.000	....	10.959	7.116	5.26	285	391	391	569	569	640	676	783	890
7.625	26.4	6.844	0.328	7.625	....	7.519	3.838	3.51	146	200	200	291	291	327	346	400	455
7.625	29.7	6.750	0.375	7.625	....	8.541	4.384	3.49	175	241	241	351	351	395	416	482	548
7.625	33.7	6.640	0.430	7.625	....	9.720	5.562	4.58	222	306	306	445	445	501	528	612	695
7.625	39.0	6.500	0.500	7.625	....	11.192	6.939	4.51	278	382	382	555	555	625	659	763	867
7.625	42.8	6.376	0.562	7.625	....	12.470	8.217	5.50	329	452	452	657	657	740	781	904	1027
7.625	45.3	6.310	0.595	7.625	....	13.141	8.888	6.02	356	489	489	711	711	800	844	978	1111
7.750	46.1	6.435	0.595	7.750	....	13.374	9.039	5.99	362	497	497	723	723	814	859	994	1130
7.750	48.6	6.345	0.640	7.750	....	14.296	9.911	5.90	396	545	545	793	793	892	942	1090	1239
8.625	32.0	7.796	0.352	8.625	....	9.149	4.643	3.90	188	255	255	371	371	418	441	511	580
8.625	36.0	7.700	0.400	8.625	....	10.336	5.516	3.81	221	303	303	441	441	496	524	607	690
8.625	40.0	7.600	0.450	8.625	....	11.557	6.737	4.78	269	371	371	539	539	606	640	741	842
8.625	44.0	7.500	0.500	8.625	....	12.763	7.889	4.98	316	434	434	631	631	710	749	868	986
8.625	49.0	7.386	0.557	8.625	....	14.118	9.190	5.23	368	505	505	735	735	827	873	1011	1149
9.625	40.0	8.679	0.395	9.625	....	11.454	5.947	3.64	238	327	327	476	476	535	565	654	743
9.625	43.5	8.599	0.435	9.625	....	12.559	7.052	4.35	282	388	388	564	564	635	670	776	882
9.625	47.0	8.525	0.472	9.625	....	13.572	8.005	4.28	320	440	440	640	640	720	760	881	1001
9.625	53.5	8.379	0.545	9.625	....	15.546	9.918	4.91	397	545	545	793	793	893	942	1091	1240
9.625	58.4	8.279	0.595	9.625	....	16.879	11.251	5.70	450	619	619	900	900	1013	1069	1238	1406
9.875	62.8	8.469	0.625	9.875	....	18.162	12.355	6.14	494	680	680	988	988	1112	1174	1359	1544
10.750	45.5	9.794	0.400	10.750	....	13.006	7.090	4.77	284	390	390	567	567	638	674	780	886
10.750	51.0	9.694	0.450	10.750	....	14.561	8.251	4.53	330	454	454	660	660	743	784	908	1031
10.750	55.5	9.604	0.495	10.750	....	15.947	9.569	4.53	383	526	526	766	766	861	909	1053	1196
10.750	60.7	9.504	0.545	10.750	....	17.473	11.095	5.48	444	610	610	888	888	999	1054	1220	1387
10.750	65.7	9.404	0.595	10.750	....	18.982	12.557	5.56	501	690	690	1003	1003	1128	1191	1379	1567
11.750	54.0	10.724	0.435	11.750	....	15.463	8.413	4.18	337	463	463	673	673	757	799	925	1052
11.750	60.0	10.616	0.489	11.750	....	17.300	10.249	5.15	410	564	564	820	820	922	974	1127	1281
11.750	65.0	10.526	0.534	11.750	....	18.816	11.613	5.11	465	639	639	929	929	1045	1103	1277	1452
11.750	71.0	10.430	0.582	11.750	....	20.420	13.265	6.02	531	730	730	1061	1061	1194	1260	1459	1658
11.750	75.0	10.358	0.618	11.750	....	21.613	14.414	5.80	577	793	793	1153	1153	1297	1369	1586	1802
11.875	71.8	10.555	0.582	11.875	....	20.648	13.378	6.00	535	736	736	1070	1070	1204	1271	1472	1672
13.375	68.0	12.259	0.480	13.375	....	19.445	11.139	4.86	446	613	613	891	891	1003	1058	1225	1392
13.375	72.0	12.191	0.514	13.375	....	20.768	12.427	5.47	497	683	683	994	994	1118	1181	1367	1553
13.375	77.0	12.119	0.550	13.375	....	22.160	13.417	5.15	537	738	738	1073	1073	1208	1275	1476	1677
13.375	80.7	12.059	0.580	13.375	....	23.314	14.598	5.72	584	803	803	1168	1168	1314	1387	1606	1825
13.375	85.0	12.003	0.608	13.375	....	24.386	15.699	6.25	628	863	863	1256	1256	1413	1491	1727	1962
13.375	86.0	11.969	0.625	13.375	....	25.035	16.283	5.70	651	896	896	1303	1303	1465	1547	1791	2035
13.625	88.2	12.219	0.625	13.625	....	25.525	16.522	5.67	661	909	909	1322	1322	1487	1570	1817	2065



GRANT PRIDECO Atlas Bradford HD-L is a flush OD connection with superior pressure resistance and structural integrity. Connector design features identical 5° radial metal-to-metal internal and external pressure seals rated to API internal and collapse pressure ratings for pipe body, robust hooked thread form that resists cross-threading and jump-out, equal critical areas in tension and compression, and excellent resistance to cyclical, combined loading including bending. It has been used for severe applications in straight and directional wells.

Grant Prideco—Atlas Bradford NJO

Type: Integral **Seal: Metal-to-metal**

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	18.0	4.151	0.362	5.178	....	5.275	3.745	3.18	150	206	206	300	300	337	356	412	468
5.000	20.3	4.059	0.408	5.194	....	5.886	4.356	3.18	174	240	240	348	348	392	414	479	545
5.000	20.8	4.031	0.422	5.206	....	6.069	4.540	3.18	182	250	250	363	363	409	431	499	568
5.000	21.4	4.001	0.437	5.218	....	6.264	4.735	3.18	189	260	260	379	379	426	450	521	592
5.000	23.2	3.919	0.478	5.206	....	6.791	5.163	3.64	207	284	284	413	413	465	490	568	645
5.000	24.1	3.875	0.500	5.223	....	7.069	5.441	3.64	218	299	299	435	435	490	517	599	680
5.500	17.0	4.767	0.304	5.702	....	4.962	3.304	2.82	132	182	182	264	264	297	314	363	413
5.500	20.0	4.653	0.361	5.672	....	5.828	4.060	3.21	162	223	223	325	325	365	386	447	508
5.500	23.0	4.545	0.415	5.698	....	6.630	4.862	3.21	194	267	267	389	389	438	462	535	608
5.500	26.0	4.423	0.476	5.726	....	7.513	5.691	3.61	228	313	313	455	455	512	541	626	711
5.500	28.4	4.315	0.530	5.748	....	8.275	6.431	3.64	257	354	354	514	514	579	611	707	804
5.500	29.7	4.251	0.562	5.777	....	8.718	6.874	3.64	275	378	378	550	550	619	653	756	859
6.625	28.0	5.666	0.417	6.815	....	8.133	5.685	3.36	227	313	313	455	455	512	540	625	711
6.625	32.0	5.550	0.475	6.849	....	9.177	6.757	3.70	270	372	372	541	541	608	642	743	845
6.625	35.0	5.450	0.525	6.890	....	10.061	7.640	3.70	306	420	420	611	611	688	726	840	955
7.000	26.0	6.151	0.362	7.231	....	7.549	5.142	2.85	206	283	283	411	411	463	488	566	643
7.000	29.0	6.059	0.408	7.177	....	8.449	5.887	3.35	235	324	324	471	471	530	559	648	736
7.000	32.0	5.969	0.453	7.197	....	9.317	6.755	3.35	270	372	372	540	540	608	642	743	844
7.000	35.0	5.879	0.498	7.235	....	10.172	7.610	3.35	304	419	419	609	609	685	723	837	951
7.000	38.0	5.795	0.540	7.243	....	10.959	8.268	4.15	331	455	455	661	661	744	785	909	1034
7.000	41.0	5.695	0.590	7.279	....	11.881	9.080	4.15	363	499	499	726	726	817	863	999	1135
7.000	44.0	5.595	0.640	7.319	....	12.788	9.987	4.15	399	549	549	799	799	899	949	1099	1248
7.000	46.0	5.535	0.670	7.344	....	13.324	10.523	4.15	421	579	579	842	842	947	1000	1158	1315
7.625	29.7	6.750	0.375	7.835	....	8.541	5.846	2.88	234	322	322	468	468	526	555	643	731
7.625	33.7	6.640	0.430	7.805	....	9.720	6.874	3.31	275	378	378	550	550	619	653	756	859

Table continues

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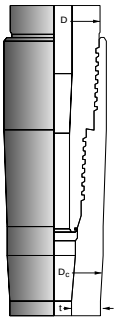

GRANT PRIDECO Atlas Bradford NJO is a proven, rugged connector with extensive success in deep, high-pressure and corrosive gas wells. It provides high tensile efficiencies with near-flush configuration, is suitable for critical casing, liner and tieback strings, features a two-step tapered, hooked thread form that eliminates jump-out, and metal-to-metal radial seal to ensure gas-tight pressure integrity.

GRANT PRIDECO Atlas Bradford BIG NJO is a large-diameter, integral joint casing connector for 14 to 20-in.-OD and medium to heavy-wall-thickness casing. Based on the standard NJO, it is recommended for conductor, surface and intermediate casing strings. Metal-to-metal internal pressure is generated by radial interference and energized by applied internal pressure. Seal angle is steeper (15°) than standard NJO (5°) to maximize galling resistance on large-OD casing.

Grant Prideco—Atlas Bradford NJO (continued)

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
7.625	39.0	6.500	0.500	7.831	....	11.192	7.835	3.64	313	431	431	627	627	705	744	862	979
7.625	42.8	6.376	0.562	7.879	....	12.470	9.114	3.64	365	501	501	729	729	820	866	1003	1139
7.625	45.3	6.310	0.595	7.906	....	13.141	9.784	3.64	391	538	538	783	783	881	929	1076	1223
7.625	47.1	6.250	0.625	7.931	....	13.744	10.388	3.64	416	571	571	831	831	935	987	1143	1299
7.625	52.8	6.076	0.712	8.017	....	15.463	12.632	4.38	505	695	695	1011	1011	1137	1200	1390	1579
7.750	46.1	6.435	0.595	8.050	....	13.374	10.405	4.10	416	572	572	832	832	936	988	1145	1301
8.625	36.0	7.700	0.400	8.844	....	10.336	6.990	3.37	280	384	384	559	559	629	664	769	874
8.625	40.0	7.600	0.450	8.839	....	11.557	8.077	3.78	323	444	444	646	646	727	767	888	1010
8.625	44.0	7.500	0.500	8.852	....	12.763	9.209	3.83	368	506	506	737	737	829	875	1013	1151
8.625	49.0	7.386	0.557	8.901	....	14.118	10.564	3.83	423	581	581	845	845	951	1004	1162	1321
9.625	43.5	8.599	0.435	9.844	....	12.559	8.353	3.42	334	459	459	668	668	752	794	919	1044
9.625	47.0	8.525	0.472	9.844	....	13.572	9.367	3.42	375	515	515	749	749	843	890	1030	1171
9.625	53.5	8.379	0.545	9.848	....	15.546	11.003	4.14	440	605	605	880	880	990	1045	1210	1375
9.625	58.4	8.279	0.595	9.892	....	16.879	12.336	4.14	493	678	678	987	987	1110	1172	1357	1542
9.875	62.8	8.469	0.625	10.162	....	18.162	13.543	4.64	542	745	745	1083	1083	1219	1287	1490	1693
10.750	51.0	9.694	0.450	10.995	....	14.561	9.727	3.42	389	535	535	778	778	875	924	1070	1216
10.750	55.5	9.604	0.495	10.975	....	15.947	10.951	4.09	438	602	602	876	876	986	1040	1205	1369
10.750	60.7	9.504	0.545	10.978	....	17.473	12.477	4.09	499	686	686	998	998	1123	1185	1372	1560
10.750	65.7	9.404	0.595	11.027	....	18.982	13.986	4.09	559	769	769	1119	1119	1259	1329	1538	1748
11.750	54.0	10.724	0.435	11.987	....	15.463	10.035	3.56	401	552	552	803	803	903	953	1104	1254
11.750	60.0	10.616	0.489	12.002	....	17.300	11.756	3.98	470	647	647	940	940	1058	1117	1293	1470
11.750	65.0	10.526	0.534	12.002	....	18.816	13.272	3.98	531	730	730	1062	1062	1194	1261	1460	1659
11.750	71.0	10.430	0.582	12.032	....	20.420	14.876	3.98	595	818	818	1190	1190	1339	1413	1636	1860
11.750	75.0	10.358	0.618	12.022	....	21.613	15.630	5.34	625	860	860	1250	1250	1407	1485	1719	1954
11.750	79.0	10.282	0.656	12.055	....	22.863	16.881	5.34	675	928	928	1350	1350	1519	1604	1857	2110
11.750	83.0	10.212	0.691	12.086	....	24.007	18.025	5.34	721	991	991	1442	1442	1622	1712	1983	2253
11.875	71.8	10.555	0.582	12.134	....	20.648	15.073	4.38	603	829	829	1206	1206	1357	1432	1658	1884
13.375	72.0	12.191	0.514	13.680	....	20.768	14.059	4.18	562	773	773	1125	1125	1265	1336	1546	1757
13.375	77.0	12.119	0.550	13.665	....	22.160	15.071	4.80	603	829	829	1206	1206	1356	1432	1658	1884
13.375	80.7	12.059	0.580	13.665	....	23.314	16.225	4.80	649	892	892	1298	1298	1460	1541	1785	2028
13.375	85.0	12.003	0.608	13.665	....	24.386	17.298	4.80	692	951	951	1384	1384	1557	1643	1903	2162
13.375	86.0	11.969	0.625	13.665	....	25.035	17.946	4.80	718	987	987	1436	1436	1615	1705	1974	2243
13.375	92.0	11.875	0.672	13.687	....	26.818	19.781	5.30	791	1088	1088	1582	1582	1780	1879	2176	2473
13.375	98.0	11.781	0.719	13.728	....	28.587	21.551	5.30	862	1185	1185	1724	1724	1940	2047	2371	2694
13.625	88.2	12.219	0.625	13.915	....	25.525	18.224	4.88	729	1002	1002	1458	1458	1640	1731	2005	2278

Grant Prideco—Atlas Bradford BIG NJO

Type: Integral **Seal: Metal-to-metal**

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
14.000	89.3	12.562	0.625	14.228	....	26.262	18.060	5.86	722	993	993	1445	1445	1625	1716	1987	2258
14.000	94.8	12.500	0.656	14.256	....	27.500	19.298	5.86	772	1061	1061	1544	1544	1737	1833	2123	2412
14.000	99.3	12.436	0.688	14.313	....	28.773	20.571	5.86	823	1131	1131	1646	1646	1851	1954	2263	2571
14.000	111.0	12.254	0.779	14.338	....	32.356	24.273	6.86	971	1335	1335	1942	1942	2185	2306	2670	3034
14.000	113.0	12.212	0.800	14.356	....	33.175	25.093	6.86	1004	1380	1380	2007	2007	2258	2384	2760	3137
14.000	123.0	12.068	0.872	14.477	....	35.964	27.881	6.86	1115	1533	1533	2230	2230	2509	2649	3067	3485
16.000	109.0	14.500	0.656	16.254	....	31.622	21.957	5.86	878	1208	1208	1757	1757	1976	2086	2415	2745
16.000	118.0	14.382	0.715	16.326	....	34.334	24.668	5.86	987	1357	1357	1973	1973	2220	2343	2713	3084
16.000	128.0	14.250	0.781	16.339	....	37.341	27.760	6.86	1110	1527	1527	2221	2221	2498	2637	3054	3470
16.000	131.7	14.188	0.812	16.391	....	38.744	29.163	6.86	1167	1604	1604	2333	2333	2625	2770	3208	3645
16.000	146.0	14.000	0.906	16.328	....	42.962	33.770	7.36	1351	1857	1857	2702	2702	3039	3208	3715	4221
18.625	125.9	17.125	0.656	18.874	....	37.032	25.205	5.86	1008	1386	1386	2016	2016	2268	2394	2773	3151
18.625	136.0	17.051	0.693	18.939	....	39.040	27.213	5.86	1089	1497	1497	2177	2177	2449	2585	2993	3402
18.625	137.3	17.001	0.718	18.917	....	40.392	28.644	6.36	1146	1575	1575	2292	2292	2578	2721	3151	3581
18.625	148.8	16.875	0.781	19.002	....	43.782	32.034	6.36	1281	1762	1762	2563	2563	2883	3043	3524	4004
20.000	133.0	18.542	0.635	20.221	....	38.631	25.306	5.86	1012	1392	1392	2024	2024	2278	2404	2784	3163
20.000	141.9	18.436	0.688	20.270	....	41.741	28.415	5.86	1137	1563	1563	2273	2273	2557	2699	3126	3552
20.000	147.0	18.394	0.709	20.263	....	42.969	29.877	6.86	1195	1643	1643	2390	2390	2689	2838	3286	3735
20.000	154.2	18.312	0.750	20.335	....	45.357	32.265	6.86	1291	1775	1775	2581	2581	2904	3065	3549	4033
20.000	169.0	18.188	0.812	20.448	....	48.948	35.857	6.86	1434	1972	1972	2869	2869	3227	3406	3944	4482
20.000	184.8	18.000	0.906	20.417	....	54.347	41.558	7.86	1662	2286	2286	3325	3325	3740	3948	4571	5195
20.000	202.9	17.812	1.000	20.501	....	59.690	46.902	7.86	1876	2580	2580	3752	3752	4221	4456	5159	5863

Grant Prideco—Atlas Bradford SB (Special Bore)

Type: Upset **Seal: Metal-to-metal**

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	15.0	4.283	0.296	5.370	....	4.374	3.999	3.14	160	220	220	320	320	360	380	440	500
5.000	18.0	4.151	0.362	5.455	....	5.275	4.902	3.14	196	270	270	392	392	441	466	539	613
5.500	17.0	4.767	0.304	5.900	....	4.962	4.532	3.47	181	249	249	363	363	408	431	499	567
5.500	20.0	4.653	0.361	6.000	....	5.828	5.400	3.47	216	297	297	432	432	486	513	594	675
5.500	23.0	4.545	0.415	6.035	....	6.630	6.203	3.47	248	341	341	496	496	558	589	682	775
7.000	23.0	6.241	0.317	7.444	....	6.655	6.029	3.82	241	332	332	482	482	543	573	663	754
7.000	26.0	6.151	0.362	7.444	....	7.549	6.924	3.82	277	381	381	554	554	623	658	762	866
7.000	29.0	6.059	0.408	7.572	....	8.449	7.826	3.82	313	430	430	626	626	704	743	861	978
7.000	32.0	5.969	0.453	7.580	....	9.317	8.695	3.82	348	478	478	696	696	783	826	956	1087

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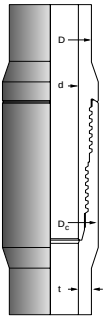
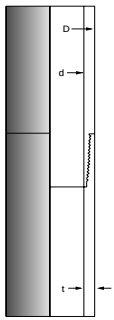
Grant Prideco—Atlas Bradford ST-L

Type: Integral flush joint **Seal: Metal-to-metal, threaded, resilient optional** **Minimum joint tension strength, kips**

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_{80}	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.369	0.253	5.000	....	3.773	2.054	3.25	82	113	113	164	164	185	195	226	257
5.000	15.0	4.283	0.296	5.000	....	4.374	2.494	3.86	100	137	137	200	200	224	237	274	312
5.000	18.0	4.151	0.362	5.000	....	5.275	3.072	3.16	123	169	169	246	246	276	292	338	384
5.000	20.3	4.059	0.408	5.000	....	5.886	3.892	4.75	156	214	214	311	311	350	370	428	487
5.000	20.8	4.031	0.422	5.000	....	6.069	3.729	4.00	149	205	205	298	298	336	354	410	466
5.000	21.4	4.001	0.437	5.000	....	6.264	4.184	5.07	167	230	230	335	335	377	397	460	523
5.000	23.6	3.919	0.478	5.000	....	6.791	4.589	5.52	184	252	252	367	367	413	436	505	574
5.000	24.2	3.875	0.500	5.000	....	7.069	4.071	3.57	163	224	224	326	326	366	387	448	509
5.500	14.0	4.887	0.244	5.500	....	4.029	2.154	3.05	86	118	118	172	172	194	205	237	269
5.500	15.5	4.825	0.275	5.500	....	4.514	2.226	3.00	89	122	122	178	178	200	211	245	278
5.500	17.0	4.767	0.304	5.500	....	4.962	2.627	3.62	105	144	144	210	210	236	250	289	328
5.500	20.0	4.653	0.361	5.500	....	5.828	3.428	4.64	137	189	189	274	274	309	326	377	429
5.500	23.0	4.545	0.415	5.500	....	6.630	4.170	4.19	167	229	229	334	334	375	396	459	521
5.500	26.0	4.423	0.476	5.500	....	7.513	5.037	5.44	201	277	277	403	403	453	479	554	630
5.500	26.7	4.375	0.500	5.500	....	7.854	4.979	5.44	199	274	274	398	398	448	473	548	622
5.500	28.4	4.315	0.530	5.500	....	8.275	4.805	3.76	192	264	264	384	384	432	456	529	601
5.500	29.7	4.251	0.562	5.500	....	8.718	5.095	3.95	204	280	280	408	408	459	484	560	637
5.500	32.3	4.151	0.612	5.500	....	9.398	5.397	4.16	216	297	297	432	432	486	513	594	675
6.625	20.0	5.924	0.288	6.625	....	5.734	3.267	3.82	131	180	180	261	261	294	310	359	408
6.625	24.0	5.796	0.352	6.625	....	6.937	4.150	4.74	166	228	228	332	332	374	394	457	519
6.625	28.0	5.666	0.417	6.625	....	8.133	5.437	4.95	217	299	299	435	435	489	517	598	680
6.625	32.0	5.550	0.475	6.625	....	9.177	6.250	5.61	250	344	344	500	500	563	594	688	781
7.000	17.0	6.413	0.231	7.000	....	4.912	2.585	2.89	103	142	142	207	207	233	246	284	323
7.000	20.0	6.331	0.272	7.000	....	5.749	3.203	3.50	128	176	176	256	256	288	304	352	400
7.000	23.0	6.241	0.317	7.000	....	6.655	3.871	4.16	155	213	213	310	310	348	368	426	484
7.000	26.0	6.151	0.362	7.000	....	7.549	4.472	3.62	179	246	246	358	358	402	425	492	559
7.000	29.0	6.059	0.408	7.000	....	8.449	5.403	4.09	216	297	297	432	432	486	513	594	675
7.000	32.0	5.969	0.453	7.000	....	9.317	6.245	5.28	250	343	343	500	500	562	593	687	781
7.000	35.0	5.879	0.498	7.000	....	10.172	6.911	5.79	276	380	380	553	553	622	657	760	864
7.000	38.0	5.795	0.540	7.000	....	10.959	7.520	6.17	301	414	414	602	602	677	714	827	940
7.000	41.0	5.695	0.590	7.000	....	11.881	8.090	6.68	324	445	445	647	647	728	769	890	1011
7.000	44.0	5.595	0.640	7.000	....	12.788	8.312	4.47	332	457	457	665	665	748	790	914	1039
7.000	46.0	5.535	0.670	7.000	....	13.324	8.609	6.35	344	473	473	689	689	775	818	947	1076
7.000	49.5	5.415	0.730	7.000	....	14.379	9.810	7.25	392	540	540	785	785	883	932	1079	1226
7.625	24.0	6.900	0.300	7.625	....	6.904	3.964	2.89	159	218	218	317	317	357	377	436	496
7.625	26.4	6.844	0.328	7.625	....	7.519	4.373	4.28	175	241	241	350	350	394	415	481	547
7.625	29.7	6.750	0.375	7.625	....	8.541	5.550	4.39	222	305	305	444	444	500	527	611	694
7.625	33.7	6.640	0.430	7.625	....	9.720	6.493	5.03	260	357	357	519	519	584	617	714	812
7.625	39.0	6.500	0.500	7.625	....	11.192	7.135	4.83	285	392	392	571	571	642	678	785	892
7.625	42.8	6.376	0.562	7.625	....	12.470	8.668	6.60	347	477	477	693	693	780	823	953	1084
7.625	45.3	6.310	0.595	7.625	....	13.141	9.191	6.97	368	506	506	735	735	827	873	1011	1149
7.625	47.1	6.250	0.625	7.625	....	13.744	9.653	7.31	386	531	531	772	772	869	917	1062	1207
7.625	51.2	6.126	0.687	7.625	....	14.974	9.050	4.98	362	498	498	724	724	815	860	996	1131
7.625	53.1	6.076	0.712	7.625	....	15.463	9.218	5.07	369	507	507	737	737	830	876	1014	1152
7.625	55.3	6.000	0.750	7.625	....	16.199	11.447	5.18	458	630	630	916	916	1030	1087	1259	1431
7.750	46.1	6.435	0.595	7.750	....	13.374	9.303	6.92	372	512	512	744	744	837	884	1023	1163
8.625	24.0	7.972	0.264	8.625	....	6.934	3.788	3.23	152	208	208	303	303	341	360	417	474
8.625	28.0	7.892	0.304	8.625	....	7.947	4.536	3.83	181	249	249	363	363	408	431	499	567
8.625	32.0	7.796	0.352	8.625	....	9.149	5.423	4.53	217	298	298	434	434	488	515	597	678
8.625	36.0	7.700	0.400	8.625	....	10.336	6.319	4.63	273	375	375	546	546	614	648	750	852
8.625	40.0	7.600	0.450	8.625	....	11.557	7.778	5.22	311	428	428	622	622	700	739	856	972
8.625	44.0	7.500	0.500	8.625	....	12.763	7.423	3.65	297	408	408	594	594	668	705	817	928
8.625	49.0	7.386	0.557	8.625	....	14.118	8.338	4.05	334	459	459	667	667	750	792	917	1042
9.625	36.0	8.765	0.352	9.625	....	10.254	6.147	4.71	246	338	338	492	492	553	584	676	768
9.625	40.0	8.679	0.395	9.625	....	11.454	6.867	3.60	275	378	378	549	549	618	652	755	858
9.625	43.5	8.599	0.435	9.625	....	12.559	8.418	5.09	337	463	463	673	673	758	800	926	1052
9.625	47.0	8.525	0.472	9.625	....	13.572	8.961	5.50	358	493	493	717	717	806	851	986	1120
9.625	53.5	8.379	0.545	9.625	....	15.546	9.780	5.50	391	538	538	782	782	880	929	1076	1223
9.625	58.4	8.279	0.595	9.625	....	16.879	10.970	5.72	439	603	603	878	878	987	1042	1207	1371
9.875	62.8	8.469	0.625	9.875	....	18.162	12.769	7.33	511	702	702	1022	1022	1149	1213	1405	1596
10.750	40.5	9.894	0.350	10.750	....	11.435	6.855	4.67	274	377	377	548	548	617	651	754	857
10.750	45.5	9.794	0.400	10.750	....	13.006	7.796	4.99	312	429	429	624	624	702	741	858	975
10.750	51.0	9.694	0.450	10.750	....	14.561	9.831	5.27	393	541	541	786	786	885	934	1081	1229
10.750	55.5	9.604	0.495	10.750	....	15.947	9.559	5.59	382	526	526	765	765	860	908	1051	1195
10.750	60.7	9.504	0.545	10.750	....	17.473	12.175	6.39	487	670	670	974	974	1096	1157	1339	1522
10.750	65.7	9.404	0.595	10.750	....	18.982	11.378	6.22	455	626	626	910	910	1024	1081	1252	1422
11.750	60.0	10.616	0.489	11.750	....	17.300	10.389	5.52	415	570	570	830	830	933	985	1141	1296
11.750	65.0	10.526	0.534	11.750	....	18.816	11.067	5.61	443	609	609	885	885	996	1051	1217	1383
11.750	71.0	10.430	0.582	11.750	....	20.420	12.240	6.11	490	673	673	979	979	1102	1163	1346	1530
11.750	74.6	10.358	0.618	11.750	....	21.613	12.954	6.34	518	712	712	1036	1036	1166	1231	1425	1619
11.875	71.8	10.555	0.582	11.875	....	20.648	12.376	6.12	495	681	681	990	990	1114	1176	1361	1547
13.375	61.0	12.359	0.430	13.375	....	17.487	10.481	5.09	419	576	576	838	838	943	996	1153	1310
13.375	68.0	12.259	0.480	13.375	....	19.445	11.655	5.44	466	641	641	932	932	1049	1107	1282	1457
13.375	72.0	12.191	0.514	13.375	....	20.768	14.339	6.02	574	789	789	1147	1147	1291	1362	1577	1792
13.375	77.0	12.119	0.550	13.375	....	22.160	13.281	5.85	531	730	730	1062	1062	1195	1262	1461	1660
13.375	85.0	12.003	0.608	13.375	....	24.386	14.616	6.22	585	804	804	1169	1169	1315	1389	1608	1827
13.625	88.2	12.219	0.625	13.625	....	25.525	18.048	7.34	722	993	993	1444	1444	1624	1715	1985	2256



GRANT PRIDECO Atlas Bradford SB (Special Bore) is a version of the RTS connection with slightly increased diameter allowing bored upset ID to have a finished diameter equal to pipe body nominal ID and eliminating standard two-step tubing connector internal restriction. It offers reduced turbulence, easier wireline tool running, more uniform plastic coating and reduced wireline damage of plastic coating, and is machined on standard two-step upsets.



GRANT PRIDECO Atlas Bradford ST-L is a flush OD premium tubing connection featuring negative-angle load flanks and twin lead threads for superior strength. Radial metal-to-metal seals and optional seal ring provide protection against internal and external pressures. Trapped 15° external torque shoulder withstands high make-up torque. Designed for easy stabbing and fast make-up.

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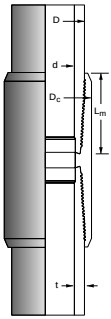

GRANT PRIDECO Atlas Bradford TC-II is the latest generation premium threaded and coupled tubing and casing connection. Developed to replace the TC-4S, it features modified buttress tapered run-out thread, metal-to-metal internal radial flank seal, optional resilient Teflon seal ring as backup to primary metal-to-metal seal, 15° reverse internal torque shoulder, smooth ID bore and minimized coupling OD. Performance exceeds pipe body ratings in internal pressure, external pressure, tension and compression.

Grant Prideco—Atlas Bradford TC-II

Type: Threaded, coupled Seal: Metal-to-metal, threaded, resilient optional Minimum joint tension strength, kips

D	w	d	t	D_c	D_{sc}	A_t	A_p	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	15.0	4.283	0.296	5.428	.....	4.374	4.374	4.35	175	241	241	350	350	394	416	481	547
5.000	18.0	4.151	0.362	5.533	.....	5.275	5.275	4.35	211	290	290	422	422	475	501	580	659
5.000	20.3	4.059	0.408	5.603	.....	5.886	5.886	4.35	235	324	324	471	471	530	559	647	736
5.000	20.8	4.031	0.422	5.624	.....	6.069	6.069	4.35	243	334	334	486	486	546	577	668	759
5.000	21.4	4.001	0.437	5.646	.....	6.264	6.264	4.35	251	345	345	501	501	564	595	689	783
5.000	23.6	3.919	0.478	5.705	.....	6.791	6.791	4.35	272	373	373	543	543	611	645	747	849
5.000	24.1	3.875	0.500	5.736	.....	7.069	7.069	4.35	283	389	389	565	565	636	672	778	884
5.500	15.5	4.825	0.275	5.896	.....	4.514	4.514	4.38	181	248	248	361	361	406	429	497	564
5.500	17.0	4.767	0.304	5.944	.....	4.962	4.962	4.38	198	273	273	397	397	447	471	546	620
5.500	20.0	4.653	0.361	6.036	.....	5.828	5.828	4.38	233	321	321	466	466	525	554	641	729
5.500	23.0	4.545	0.415	6.120	.....	6.630	6.630	4.38	265	365	365	530	530	597	630	729	829
5.500	26.0	4.423	0.476	6.212	.....	7.513	7.513	4.38	301	413	413	601	601	676	714	826	939
5.500	26.8	4.375	0.500	6.247	.....	7.854	7.854	4.38	314	432	432	628	628	707	746	864	982
6.625	20.0	5.924	0.288	7.039	.....	5.734	5.734	4.54	229	315	315	459	459	516	545	631	717
6.625	23.2	5.840	0.330	7.111	.....	6.526	6.526	4.54	261	359	359	522	522	587	620	718	816
6.625	24.0	5.796	0.352	7.148	.....	6.937	6.937	4.54	277	382	382	555	555	624	659	763	867
6.625	28.0	5.666	0.417	7.254	.....	8.133	8.133	4.54	325	447	447	651	651	732	773	895	1017
6.625	29.0	5.636	0.432	7.278	.....	8.405	8.405	4.54	336	462	462	672	672	756	798	925	1051
6.625	32.0	5.550	0.475	7.345	.....	9.177	9.177	4.54	367	505	505	734	734	826	872	1010	1147
6.625	35.0	5.450	0.525	7.421	.....	10.061	10.061	4.54	402	553	553	805	805	905	956	1107	1258
7.000	23.0	6.241	0.317	7.448	.....	6.655	6.655	4.86	266	366	366	532	532	599	632	732	832
7.000	26.0	6.151	0.362	7.542	.....	7.549	7.549	4.86	302	415	415	604	604	679	717	830	944
7.000	29.0	6.059	0.408	7.600	.....	8.449	8.449	4.86	338	465	465	676	676	760	803	929	1056
7.000	32.0	5.969	0.453	7.672	.....	9.317	9.317	4.86	373	512	512	745	745	839	885	1025	1165
7.000	35.0	5.879	0.498	7.743	.....	10.172	10.172	4.86	407	559	559	814	814	916	966	1119	1272
7.000	38.0	5.795	0.540	7.808	.....	10.959	10.959	4.86	438	603	603	877	877	986	1041	1206	1370
7.000	41.0	5.695	0.590	7.883	.....	11.881	11.881	4.86	475	653	653	950	950	1069	1129	1307	1485
7.625	26.4	6.844	0.328	8.106	.....	7.519	7.519	5.3	301	414	414	602	602	677	714	827	940
7.625	29.7	6.750	0.375	8.186	.....	8.541	8.541	5.3	342	470	470	683	683	769	811	940	1068
7.625	33.7	6.640	0.430	8.277	.....	9.720	9.720	5.3	389	535	535	778	778	875	923	1069	1215
7.625	35.8	6.570	0.465	8.334	.....	10.460	10.460	5.3	418	575	575	837	837	941	994	1151	1307
7.625	39.0	6.500	0.500	8.390	.....	11.192	11.192	5.3	448	616	616	895	895	1007	1063	1231	1399
7.625	42.8	6.376	0.562	8.487	.....	12.470	12.470	5.3	499	686	686	998	998	1122	1185	1372	1559
7.625	47.1	6.250	0.625	8.582	.....	13.744	13.744	5.3	550	756	756	1100	1100	1237	1306	1512	1718
7.750	46.0	6.435	0.595	8.660	.....	13.374	13.374	5.37	535	736	736	1070	1070	1204	1271	1471	1672
7.750	48.0	6.375	0.625	8.705	.....	13.990	13.990	5.37	560	769	769	1119	1119	1259	1329	1539	1749
7.750	49.0	6.345	0.640	8.728	.....	14.296	14.296	5.37	572	786	786	1144	1144	1287	1358	1573	1787
8.625	28.0	7.892	0.304	9.083	.....	7.947	7.947	5.04	318	437	437	636	636	715	755	874	993
8.625	32.0	7.796	0.352	9.167	.....	9.149	9.149	5.04	366	503	503	732	732	823	869	1006	1144
8.625	36.0	7.700	0.400	9.250	.....	10.336	10.336	5.04	413	568	568	827	827	930	982	1137	1292
8.625	40.0	7.600	0.450	9.333	.....	11.557	11.557	5.04	462	636	636	925	925	1040	1098	1271	1445
8.625	44.0	7.500	0.500	9.415	.....	12.763	12.763	5.04	511	702	702	1021	1021	1149	1212	1404	1595
8.625	49.0	7.346	0.577	9.507	.....	14.589	14.589	5.04	584	802	802	1167	1167	1313	1386	1605	1824
9.625	36.0	8.765	0.352	10.160	.....	10.254	10.254	5.23	410	564	564	820	820	923	974	1128	1282
9.625	40.0	8.679	0.395	10.235	.....	11.454	11.454	5.23	458	630	630	916	916	1031	1088	1260	1432
9.625	43.5	8.599	0.435	10.303	.....	12.559	12.559	5.23	502	691	691	1005	1005	1130	1193	1381	1570
9.625	47.0	8.525	0.472	10.366	.....	13.572	13.572	5.23	543	746	746	1086	1086	1222	1289	1493	1697
9.625	53.5	8.379	0.545	10.487	.....	15.546	15.546	5.23	622	855	855	1244	1244	1399	1477	1710	1943
9.625	58.4	8.279	0.595	10.567	.....	16.879	16.879	5.23	675	928	928	1350	1350	1519	1604	1857	2110
9.875	62.8	8.469	0.625	10.860	.....	18.162	18.162	5.37	726	999	999	1453	1453	1635	1725	1998	2270
10.750	40.5	9.894	0.350	11.283	.....	11.435	11.435	5.26	457	629	629	915	915	1029	1086	1258	1429
10.750	45.5	9.794	0.400	11.372	.....	13.006	13.006	5.26	520	715	715	1040	1040	1171	1236	1431	1626
10.750	51.0	9.694	0.450	11.458	.....	14.561	14.561	5.26	582	801	801	1165	1165	1311	1383	1602	1820
10.750	55.5	9.604	0.495	11.535	.....	15.947	15.947	5.26	638	877	877	1276	1276	1435	1515	1754	1993
10.750	60.7	9.504	0.545	11.619	.....	17.473	17.473	5.26	699	961	961	1398	1398	1573	1660	1922	2184
10.750	65.7	9.404	0.595	11.702	.....	18.982	18.982	5.26	759	1044	1044	1519	1519	1708	1803	2088	2373
11.750	47.0	10.844	0.375	12.323	.....	13.401	13.401	5.38	536	737	737	1072	1072	1206	1273	1474	1675
11.750	54.0	10.724	0.435	12.429	.....	15.463	15.463	5.38	619	850	850	1237	1237	1392	1469	1701	1933
11.750	60.0	10.616	0.489	12.523	.....	17.300	17.300	5.38	692	951	951	1384	1384	1557	1643	1903	2162
11.750	65.0	10.526	0.534	12.600	.....	18.816	18.816	5.38	753	1035	1035	1505	1505	1693	1788	2070	2352
11.750	71.0	10.430	0.582	12.681	.....	20.420	20.420	5.38	817	1123	1123	1634	1634	1838	1940	2246	2552
11.750	74.6	10.358	0.618	12.741	.....	21.613	21.613	5.38	865	1189	1189	1729	1729	1945	2053	2377	2702
11.875	71.0	10.555	0.582	12.816	.....	20.648	20.648	5.22	826	1136	1136	1652	1652	1858	1962	2271	2581
13.375	54.5	12.459	0.380	13.947	.....	15.513	15.513	5.61	621	853	853	1241	1241	1396	1474	1706	1939
13.375	61.0	12.359	0.430	14.037	.....	17.487	17.487	5.61	699	962	962	1399	1399	1574	1661	1924	2186
13.375	68.0	12.259	0.480	14.126	.....	19.445	19.445	5.61	778	1069	1069	1556	1556	1750	1847	2139	2431
13.375	72.0	12.191	0.514	14.185	.....	20.768	20.768	5.61	831	1142	1142	1661	1661	1869	1973	2284	2596
13.375	77.0	12.119	0.550	12.248	.....	22.160	22.160	5.61	886	1219	1219	1773	1773	1994	2105	2438	2770
13.375	80.7	12.203	0.508	14.299	.....	20.535	20.535	5.61	821	1129	1129	1643	1643	1848	1951	2259	2567
13.375	91.0	11.899	0.660	14.435	.....	26.364	26.364	5.61	1055	1450	1450	2109	2109	2373	2505	2900	3295
13.625	88.2	12.219	0.625	14.636	.....	25.525	25.525	5.45	1021	1404	1404	2042	2042	2297	2425	2808	3191

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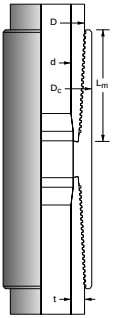

HSC CORP. HSC is a non-upset threaded and coupled premium connection with a tapered thread and metal-to-metal seal. The seal is maximized by storing the torqued energy across the 15° shoulder. With HSC coupling, joint performance exceeds the tensile strength of the pipe body.

HSC Corporation—HSC

Type: Coupled Seal: Metal-to-metal

									Minimum joint tension strength, kips								
D	**w**	**d**	**t**	**D_j**	**D_{cr}**	**A_t**	**A_c**	**L_m**	**H-40**	**J-55**	**K-55**	**L-80**	**N-80**	**C-90**	**C/T-95**	**P-110**	**Q-125**
5.000	13.0	4.369	0.253	5.59	5.39	....	....	4.724	....	....	208	....	302	340	359	415	472
5.000	15.0	4.283	0.296	5.59	5.39	....	....	4.724	....	....	241	....	350	394	416	481	547
5.000	18.0	4.151	0.362	5.59	5.39	....	....	4.724	....	....	290	....	422	475	501	580	659
5.000	21.4	4.001	0.437	5.59	5.39	....	....	4.724	....	....	345	....	501	564	596	689	783
5.000	23.2	3.919	0.478	5.59	5.39	....	....	4.724	....	....	373	....	543	611	645	747	849
5.500	15.5	4.825	0.275	6.08	5.89	....	....	4.850	....	....	248	....	361	406	429	497	564
5.500	17.0	4.767	0.304	6.08	5.89	....	....	4.850	....	....	273	....	397	447	471	546	620
5.500	20.0	4.653	0.361	6.08	5.89	....	....	4.850	....	....	321	....	466	525	554	641	729
5.500	23.0	4.545	0.415	6.08	5.89	....	....	4.850	....	....	365	....	530	597	630	729	829
5.500	26.0	4.423	0.476	6.08	5.89	....	....	4.850	....	....	413	....	601	676	714	826	939
6.625	20.0	5.924	0.288	7.41	7.02	....	....	4.965	....	....	316	....	459	516	545	631	717
6.625	24.0	5.796	0.352	7.41	7.02	....	....	4.965	....	....	382	....	555	624	659	763	867
6.625	28.0	5.666	0.417	7.41	7.02	....	....	4.965	....	....	447	....	651	732	772	895	1017
6.625	32.0	5.550	0.475	7.41	7.02	....	....	4.965	....	....	505	....	734	826	872	1010	1147
7.000	23.0	6.241	0.317	7.68	7.39	....	....	5.288	....	....	366	....	532	599	632	732	832
7.000	26.0	6.151	0.362	7.68	7.39	....	....	5.288	....	....	415	....	604	679	717	830	944
7.000	29.0	6.059	0.408	7.68	7.39	....	....	5.288	....	....	465	....	676	760	803	929	1056
7.000	32.0	5.969	0.453	7.68	7.39	....	....	5.288	....	....	512	....	745	839	885	1025	1165
7.000	35.0	5.879	0.498	7.68	7.39	....	....	5.288	....	....	559	....	814	916	966	1119	1272
7.000	38.0	5.795	0.540	7.68	7.39	....	....	5.288	....	....	603	....	877	986	1041	1206	1370
7.625	26.4	6.844	0.328	8.53	8.14	....	....	5.406	....	....	413	....	601	677	714	827	940
7.625	29.7	6.750	0.375	8.53	8.14	....	....	5.406	....	....	470	....	683	769	811	940	1068
7.625	33.7	6.640	0.430	8.53	8.14	....	....	5.406	....	....	535	....	778	875	923	1069	1215
7.625	39.0	6.500	0.500	8.53	8.14	....	....	5.406	....	....	616	....	895	1007	1063	1231	1399
7.625	42.8	6.376	0.562	8.53	8.14	....	....	5.406	....	....	686	....	998	1122	1185	1372	1559
8.625	28.0	7.892	0.304	9.65	9.14	....	....	5.545	....	....	437	....	636	715	755	874	993
8.625	32.0	7.796	0.352	9.65	9.14	....	....	5.545	....	....	503	....	732	823	869	1006	1144
8.625	36.0	7.700	0.400	9.65	9.14	....	....	5.545	....	....	568	....	827	930	982	1137	1292
8.625	40.0	7.600	0.450	9.65	9.14	....	....	5.545	....	....	636	....	925	1040	1098	1271	1445
8.625	44.0	7.500	0.500	9.65	9.14	....	....	5.545	....	....	702	....	1021	1149	1212	1404	1595
8.625	49.0	7.386	0.557	9.65	9.14	....	....	5.545	....	....	776	....	1129	1271	1341	1553	1765
9.625	36.0	8.765	0.352	10.65	10.14	....	....	5.545	....	....	564	....	820	923	974	1128	1282
9.625	40.0	8.679	0.395	10.65	10.14	....	....	5.545	....	....	630	....	916	1031	1088	1260	1432
9.625	43.5	8.598	0.435	10.65	10.14	....	....	5.545	....	....	691	....	1005	1130	1193	1381	1570
9.625	47.0	8.524	0.472	10.65	10.14	....	....	5.545	....	....	746	....	1086	1222	1289	1493	1697
9.625	53.5	8.378	0.545	10.65	10.14	....	....	5.545	....	....	855	....	1244	1399	1477	1710	1943
9.625	58.4	8.278	0.595	10.65	10.14	....	....	5.545	....	....	928	....	1350	1519	1604	1857	2110
9.625	59.4	8.250	0.609	10.65	10.14	....	....	5.545	....	....	949	....	1380	1552	1639	1897	2156
10.750	40.5	9.893	0.350	11.77	11.27	....	....	5.589	....	....	629	....	915	1029	1086	1258	1429
10.750	45.5	9.793	0.400	11.77	11.27	....	....	5.589	....	....	715	....	1040	1171	1236	1431	1626
10.750	51.0	9.693	0.450	11.77	11.27	....	....	5.589	....	....	801	....	1165	1311	1383	1602	1820
10.750	55.5	9.603	0.495	11.77	11.27	....	....	5.589	....	....	877	....	1276	1435	1515	1754	1993
10.750	60.7	9.503	0.545	11.77	11.27	....	....	5.589	....	....	961	....	1398	1573	1660	1922	2184
10.750	65.7	9.403	0.595	11.77	11.27	....	....	5.589	....	....	1044	....	1519	1708	1803	2088	2373
11.750	47.0	10.843	0.375	12.77	12.08	....	....	5.589	....	....	737	....	1072	1206	1273	1474	1675
11.750	54.0	10.723	0.435	12.77	12.08	....	....	5.589	....	....	850	....	1237	1392	1469	1701	1933
11.750	60.0	10.615	0.489	12.77	12.08	....	....	5.589	....	....	951	....	1384	1557	1643	1903	2162
11.750	65.0	10.525	0.534	12.77	12.08	....	....	5.589	....	....	1377	....	2003	2253	2378	2754	3129
13.375	54.5	12.458	0.380	14.30	14.13	....	....	5.642	....	....	853	....	1241	1396	1474	1706	1939
13.375	61.0	12.358	0.430	14.30	14.13	....	....	5.642	....	....	962	....	1399	1574	1661	1924	2186
13.375	68.0	12.258	0.480	14.30	14.13	....	....	5.642	....	....	1069	....	1556	1750	1847	2139	2431
13.375	72.0	12.190	0.514	14.30	14.13	....	....	5.642	....	....	1142	....	1661	1869	1973	2284	2596
13.375	77.0	12.118	0.550	14.30	14.13	....	....	5.642	....	....	1219	....	1773	1994	2105	2438	2770
13.375	80.1	12.058	0.580	14.30	14.13	....	....	5.642	....	....	1282	....	1865	2098	2215	2565	2914
13.375	85.0	12.002	0.608	14.30	14.13	....	....	5.642	....	....	1341	....	1951	2195	2317	2682	3014
13.375	86.0	11.968	0.625	14.30	14.13	....	....	5.642	....	....	1377	....	2003	2253	2378	2754	3129

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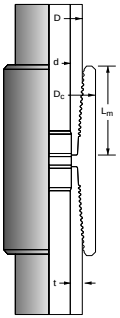
Hunting Interlock, Inc.—BIG "O" SEAL-LOCK

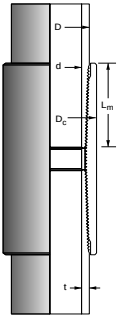
Type: Coupled	Seal: Metal-to-metal								Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{pc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
13.625	88.2	12.219	0.625	15.000	....	25.525	25.525	5.842	1532	1914	2425	2425	2553	2553	2680	3191	3446
13.625	94.7	12.099	0.685	15.000	....	27.847	27.847	5.842	1671	2089	2645	2645	2785	2785	2924	3481	3759
13.625	104.5	11.949	0.760	15.000	....	30.717	30.716	5.842	1843	2304	2918	2918	3072	3072	3225	3840	4147
14.000	82.5	12.688	0.562	15.000	....	23.726	23.726	5.842	1424	1779	2254	2254	2373	2373	2491	2966	3203
14.000	94.8	12.500	0.656	15.000	....	27.500	27.500	5.842	1650	2063	2613	2613	2750	2750	2888	3438	3713
14.000	99.3	12.436	0.688	15.125	....	28.773	28.773	5.842	1726	2158	2733	2733	2877	2877	3021	3597	3884
14.000	111.0	12.254	0.779	15.125	....	32.356	31.947	5.842	1917	2396	3035	3035	3195	3195	3354	3993	4313
14.000	123.0	12.250	0.872	15.125	.....	35.964	31.947	5.842	1917	2396	3035	3035	3195	3195	3354	3993	4313
16.000	75.0	14.936	0.438	17.000	....	21.414	21.414	4.675	1285	1606	2034	2034	2141	2141	2248	2677	2891
16.000	84.0	14.822	0.495	17.000	....	24.112	24.112	4.675	1447	1808	2291	2291	2411	2411	2532	3014	3255
16.000	94.5	14.688	0.562	17.000	....	27.257	27.257	4.675	1635	2044	2589	2589	2726	2726	2862	3407	3680
16.000	109.0	14.500	0.656	17.000	....	31.622	31.622	5.842	1897	2372	3004	3004	3162	3162	3320	3953	4269
16.000	118.0	14.382	0.715	17.000	....	34.334	32.954	5.842	1977	2472	3131	3131	3295	3295	3460	4119	4449
16.000	128.0	14.250	0.781	17.000	....	37.341	32.954	5.842	1977	2472	3131	3131	3295	3295	3460	4119	4449
18.625	87.5	17.567	0.435	19.625	....	24.858	24.858	4.675	1491	1864	2362	2362	2486	2486	2610	3107	3356
18.625	93.7	17.501	0.468	19.625	....	26.696	26.696	4.675	1602	2002	2536	2536	2670	2670	2803	3337	3604
18.625	96.5	17.467	0.485	19.625	....	27.639	27.639	4.675	1658	2073	2626	2626	2764	2764	2902	3455	3731
18.625	109.4	17.311	0.563	19.625	....	31.947	31.947	4.675	1917	2396	3035	3035	3195	3195	3354	3993	4313
18.625	112.0	17.279	0.579	19.625	....	32.825	32.825	4.675	1970	2462	3118	3118	3283	3283	3447	4103	4431
18.625	136.0	17.051	0.693	19.625	....	39.040	38.242	5.842	2295	2868	3633	3633	3824	3824	4015	4780	5163
20.000	94.0	18.936	0.438	21.000	....	26.918	26.918	4.675	1615	2019	2557	2557	2692	2692	2826	3365	3634
20.000	106.5	18.812	0.500	21.000	....	30.631	30.631	4.675	1838	2297	2910	2910	3063	3063	3216	3829	4135
20.000	117.0	18.686	0.563	21.000	....	34.379	34.379	4.675	2063	2578	3266	3266	3438	3438	3610	4297	4641
20.000	133.0	18.542	0.635	21.000	....	38.631	38.631	5.842	2318	2897	3670	3670	3863	3863	4056	4829	5215
20.000	147.0	18.394	0.709	21.000	....	42.969	41.043	5.842	2463	3078	3899	3899	4104	4104	4310	5130	5541
20.000	169.0	18.188	0.812	21.000	....	48.948	41.043	5.842	2463	3078	3899	3899	4104	4104	4310	5130	5541
24.000	162.0	22.542	0.635	25.250	....	46.611	46.611	5.842	2797	3496	4428	4428	4661	4661	4894	5826	6292
24.000	174.0	22.436	0.688	25.250	....	50.387	50.387	5.842	3023	3779	4787	4787	5039	5039	5291	6298	6802
24.000	189.0	22.312	0.750	25.250	....	54.781	54.782	5.842	3287	4109	5204	5204	5478	5478	5752	6848	7396
24.000	203.0	22.188	0.812	25.250	....	59.152	59.048	5.842	3543	4429	5610	5610	5905	5905	6200	7381	7971
24.000	130.0	23.312	0.500	25.250	....	37.699	37.699	5.842	2262	2827	3581	3581	3770	3770	3958	4712	5089
24.000	140.0	23.250	0.531	25.250	....	39.985	39.985	5.842	2399	2999	3799	3799	3999	3999	4198	4998	5398
24.000	165.0	23.042	0.635	25.250	....	47.609	47.609	5.842	2857	3571	4523	4523	4761	4761	4999	5951	6427



HUNTING INTERLOCK, INC. BIG "O" SEAL-LOCK is a threaded and coupled non-upset connection for large-diameter pipe. Features include 3-pitch hooked thread design with gas-tight, metal-to-metal seal and internal torque shoulder. Thread geometry and form allow for easy stabbing, quick make-up and multiple make-and-break. No welding or additional inspection is needed because it is threaded on plain-end pipe.

Hunting Interlock, Inc.—CONVERTIBLE 8 ROUND

Type: Coupled	Seal: Metal-to-metal, threaded							Minimum joint tension strength, kips								
D	d	t	D_c	D_{pc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.396	0.253	5.563	5.375	3.773	2.670	3.435	138	182	201	241	254	254	266	317	342
5.000	15.0	4.283	0.296	5.563	5.375	4.374	3.271	3.435	169	223	246	295	311	311	326	388	420
5.000	18.0	4.151	0.362	5.563	5.375	5.275	4.171	3.435	215	284	314	376	396	396	416	495	535
5.000	21.4	4.126	0.437	5.563	5.375	6.264	5.161	3.435	266	352	389	466	490	490	515	613	662
5.000	23.2	4.044	0.478	5.563	5.375	6.791	5.687	3.435	293	388	428	513	540	540	567	675	729
5.000	24.1	4.000	0.500	5.563	5.375	7.069	5.965	3.435	307	407	449	538	567	567	595	708	765
5.500	15.5	4.825	0.275	6.050	5.875	4.514	3.299	3.560	164	217	239	298	306	313	329	392	423
5.500	17.0	4.767	0.304	6.050	5.875	4.962	3.747	3.560	186	247	272	338	348	356	374	445	481
5.500	20.0	4.653	0.361	6.050	5.875	5.828	4.613	3.560	229	304	334	416	428	438	460	548	592
5.500	23.0	4.545	0.415	6.050	5.875	6.630	5.414	3.560	269	356	392	489	502	514	540	643	694
6.625	20.0	5.924	0.288	7.390	7.000	5.734	4.267	3.935	200	266	290	369	375	405	426	500	547
6.625	24.0	5.796	0.352	7.390	7.000	6.937	5.470	3.935	256	340	372	473	481	520	546	641	702
6.625	28.0	5.666	0.417	7.390	7.000	8.133	6.666	3.935	312	415	454	576	586	633	665	781	855
6.625	32.0	5.550	0.475	7.390	7.000	9.177	7.710	3.935	361	480	525	666	678	732	769	904	989
7.000	23.0	6.241	0.317	7.656	7.375	6.656	5.105	4.060	235	313	341	435	442	479	505	590	655
7.000	26.0	6.151	0.362	7.656	7.375	7.549	5.998	4.060	276	367	401	511	519	563	593	693	769
7.000	29.0	6.059	0.408	7.656	7.375	8.449	6.899	4.060	318	423	461	587	597	648	683	797	885
7.000	32.0	5.969	0.453	7.656	7.375	9.317	7.766	4.060	358	476	519	661	672	729	768	897	996
7.000	35.0	5.879	0.498	7.656	7.375	10.172	8.622	4.060	397	528	576	734	746	809	853	996	1106
7.000	38.0	5.795	0.540	7.656	7.375	10.959	9.408	4.060	433	576	629	801	814	883	931	1087	1207
7.625	26.4	6.844	0.328	8.500	8.125	7.519	5.828	4.185	260	346	377	482	490	532	560	654	733
7.625	29.7	6.750	0.375	8.500	8.125	8.541	6.850	4.185	306	407	443	567	575	625	659	769	861
7.625	33.7	6.640	0.430	8.500	8.125	9.720	8.029	4.185	358	477	519	664	674	733	772	901	1009
7.625	39.0	6.500	0.500	8.500	8.125	11.192	9.501	4.185	424	564	614	786	798	867	914	1066	1194
7.625	42.8	6.376	0.562	8.500	8.125	12.470	10.779	4.185	481	640	696	891	906	984	1037	1210	1355
7.625	45.3	6.310	0.595	8.500	8.125	13.141	11.450	4.185	511	680	740	947	962	1045	1101	1285	1439
7.625	47.1	6.250	0.625	8.500	8.125	13.745	12.054	4.185	538	716	779	997	1013	1100	1159	1353	1515
8.625	32.0	7.796	0.352	9.625	9.125	9.149	7.234	4.560	313	417	452	583	591	643	678	791	887
8.625	36.0	7.700	0.400	9.625	9.125	10.336	8.421	4.560	364	486	526	678	688	749	789	921	1032
8.625	40.0	7.600	0.450	9.625	9.125	11.557	9.642	4.560	417	556	603	776	788	858	904	1055	1182
8.625	44.0	7.500	0.500	9.625	9.125	12.763	10.848	4.560	469	626	678	874	887	965	1017	1186	1330
8.625	49.0	7.386	0.557	9.625	9.125	14.118	12.203	4.560	528	704	763	983	997	1085	1144	1335	1496
9.625	36.0	8.765	0.352	10.625	10.125	10.254	8.116	4.810	339	453	489	634	643	700	738	861	966
9.625	40.0	8.679	0.395	10.625	10.125	11.454	9.315	4.810	389	520	561	727	737	804	847	988	1108
9.625	43.5	8.599	0.435	10.625	10.125	12.559	10.420	4.810	436	582	628	813	825	899	948	1105	1240
9.625	47.0	8.525	0.472	10.625	10.125	13.572	11.434	4.810	478	638	689	893	905	987	1,040	1213	1361
9.625	53.5	8.379	0.545	10.625	10.125	15.547	13.408	4.810	560	748	808	1047	1062	1157	1220	1422	1595
9.625	58.4	8.279	0.595	10.625	10.125	16.879	14.741	4.810	616	823	888	1151	1167	1272	1341	1564	1754



HUNTING INTERLOCK, INC. CONVERTIBLE 8 ROUND includes a converter ring press fit into J-area after mill end make-up, which provides a smooth bore for turbulent-free flow, positive torque stop for field end make-up, and metal-to-metal seal when used according to pin end specifications. Manufactured to ¼ of API tolerances ensures ideal match with API 8 round pins. Ability to withstand bending and torsional loads downhole make it ideal for horizontal and directional wells.

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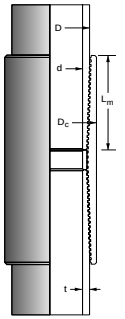
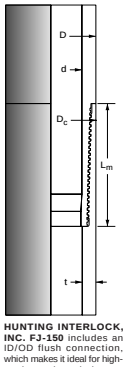


HUNTING INTERLOCK, INC. CONVERTIBLE BUTTRESS provides turbulent-free flow, metal-to-metal seal when using pin end finish specifications, positive torque stop for field end make-up and redundant back-up seal for preventing mill turns. Recommended for horizontal and deviated wells.

Hunting Interlock, Inc.—CONVERTIBLE BUTTRESS

Type: Coupled	Seal: Metal-to-metal, threaded								Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.369	0.253	5.563	5.375	3.773	....	4.310	199	252	309	327	341	348	366	434	473
5.000	15.0	4.283	0.296	5.563	5.375	4.374	....	4.310	231	293	359	379	396	404	424	503	548
5.000	18.0	4.151	0.362	5.563	5.375	5.275	....	4.310	278	353	432	457	477	487	512	606	661
5.000	21.4	4.001	0.437	5.563	5.375	6.264	....	4.310	322	403	510	510	537	537	564	671	725
5.000	23.2	3.919	0.478	5.563	5.375	6.791	....	4.310	322	403	510	510	537	537	564	671	725
5.000	24.1	3.875	0.500	5.563	5.375	7.069	....	4.310	322	403	510	510	537	537	564	671	725
5.500	15.5	4.825	0.275	6.050	5.875	4.514	....	4.373	236	300	366	389	406	415	436	517	564
5.500	17.0	4.767	0.304	6.050	5.875	4.962	....	4.373	259	329	402	428	446	456	480	568	620
5.500	20.0	4.653	0.361	6.050	5.875	5.828	....	4.373	305	387	472	503	524	536	563	667	728
5.500	23.0	4.545	0.415	6.050	5.875	6.630	....	4.373	347	435	537	551	580	580	609	725	783
6.625	20.0	5.924	0.288	7.390	7.000	5.734	....	4.560	294	374	453	489	509	523	550	650	711
6.625	24.0	5.796	0.352	7.390	7.000	6.937	....	4.560	355	453	548	592	615	633	665	786	860
6.625	28.0	5.666	0.417	7.390	7.000	8.133	....	4.560	417	531	643	693	721	742	780	922	1008
6.625	32.0	5.550	0.475	7.390	7.000	9.177	....	4.560	470	599	725	783	814	837	880	1040	1138
7.000	23.0	6.241	0.317	7.656	7.375	6.656	....	4.748	339	432	522	565	588	605	636	752	823
7.000	26.0	6.151	0.362	7.656	7.375	7.549	....	4.748	384	490	592	641	667	687	722	853	934
7.000	29.0	6.059	0.408	7.656	7.375	8.449	....	4.748	430	548	662	718	746	768	808	955	1045
7.000	32.0	5.969	0.453	7.656	7.375	9.317	....	4.748	474	605	730	791	823	847	891	1053	1152
7.000	35.0	5.879	0.498	7.656	7.375	10.172	....	4.748	518	657	797	832	876	876	920	1095	1183
7.000	38.0	5.795	0.540	7.656	7.375	10.959	....	4.748	526	657	832	832	876	876	920	1095	1183
7.625	26.4	6.844	0.328	8.500	8.125	7.519	....	4.935	378	483	581	635	659	681	716	845	926
7.625	29.7	6.750	0.375	8.500	8.125	8.541	....	4.935	430	549	660	721	749	773	813	960	1052
7.625	33.7	6.640	0.430	8.500	8.125	9.720	....	4.935	489	625	751	820	852	880	925	1093	1197
7.625	39.0	6.500	0.500	8.500	8.125	11.192	....	4.935	563	720	864	945	981	1013	1065	1258	1379
7.625	42.8	6.376	0.562	8.500	8.125	12.470	....	4.935	627	802	963	1053	1093	1129	1187	1402	1536
7.625	45.3	6.310	0.595	8.500	8.125	13.141	....	4.935	661	845	1015	1109	1152	1189	1251	1477	1619
7.625	47.1	6.250	0.625	8.500	8.125	13.745	....	4.935	691	884	1062	1160	1205	1239	1301	1545	1673
8.625	32.0	7.796	0.352	9.625	9.125	9.149	....	5.060	451	579	690	764	792	822	864	1020	1120
8.625	36.0	7.700	0.400	9.625	9.125	10.336	....	5.060	510	654	780	864	895	928	976	1152	1265
8.625	40.0	7.600	0.450	9.625	9.125	11.557	....	5.060	570	732	872	966	1001	1038	1092	1288	1415
8.625	44.0	7.500	0.500	9.625	9.125	12.763	....	5.060	630	808	963	1066	1105	1146	1206	1423	1562
8.625	49.0	7.386	0.557	9.625	9.125	14.118	....	5.060	697	894	1065	1180	1222	1268	1334	1574	1728
9.625	36.0	8.765	0.352	10.625	10.125	10.254	....	5.060	496	639	755	848	877	914	962	1133	1247
9.625	40.0	8.679	0.395	10.625	10.125	11.454	....	5.060	554	714	843	947	979	1021	1074	1266	1393
9.625	43.5	8.599	0.435	10.625	10.125	12.559	....	5.060	608	783	925	1038	1074	1119	1178	1388	1527
9.625	47.0	8.525	0.472	10.625	10.125	13.572	....	5.060	657	846	999	1122	1161	1210	1273	1500	1650
9.625	53.5	8.379	0.545	10.625	10.125	15.547	....	5.060	753	969	1145	1285	1329	1386	1458	1718	1890
10.750	40.5	9.874	0.350	11.750	11.250	11.435	....	5.060	542	700	819	934	964	1010	1063	1251	1380
10.750	45.5	9.794	0.400	11.750	11.250	13.006	....	5.060	616	796	931	1063	1097	1149	1209	1423	1570
10.750	51.0	9.694	0.450	11.750	11.250	14.561	....	5.060	690	891	1043	1190	1228	1287	1354	1594	1758
10.750	55.5	9.604	0.495	11.750	11.250	15.947	....	5.060	755	976	1142	1303	1345	1409	1483	1745	1925
10.750	60.7	9.504	0.545	11.750	11.250	17.473	....	5.060	827	1070	1251	1428	1473	1544	1625	1912	2109
10.750	65.7	9.404	0.595	11.750	11.250	18.982	....	5.060	899	1162	1359	1551	1600	1677	1765	2077	2291
11.750	47.0	10.844	0.375	12.750	12.250	13.401	....	5.060	622	807	935	1084	1116	1175	1237	1454	1607
11.750	54.0	10.724	0.435	12.750	12.250	15.463	....	5.060	718	931	1079	1250	1287	1356	1427	1677	1854
11.750	60.0	10.616	0.489	12.750	12.250	17.300	....	5.060	803	1042	1208	1399	1440	1517	1596	1877	2074
13.375	54.5	12.459	0.380	14.375	14.188	15.514	....	5.060	696	909	1038	1233	1265	1343	1414	1659	1840
13.375	61.0	12.359	0.430	14.375	14.188	17.487	....	5.060	785	1025	1170	1389	1426	1514	1594	1870	2074
13.375	68.0	12.259	0.480	14.375	14.188	19.445	....	5.060	873	1140	1300	1545	1585	1683	1772	2079	2306
13.375	72.0	12.191	0.514	14.375	14.188	20.768	....	5.060	932	1217	1389	1650	1693	1797	1893	2221	2463



HUNTING INTERLOCK, INC. FJ-150 includes an ID/OD flush connection, which makes it ideal for high-grade steels and chrome. The 90° load flank and large radius stab flank allow low hoop stresses and reduced running times. Axial metal-to-metal nose seal is created by an internal shoulder, while the external shoulder creates an external torque shoulder. Large torque shoulders allow for high torque capabilities.

Hunting Interlock, Inc.—FJ-150

Type: Flush joint	Seal: Metal-to-metal, threaded									Minimum joint tension strength, kips							
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.369	0.253	5.000	5.000	3.773	1.875	2.861	113	141	178	178	188	188	197	234	253
5.000	15.0	4.283	0.296	5.000	5.000	4.374	2.185	2.861	131	164	208	208	219	219	229	273	295
5.000	18.0	4.151	0.362	5.000	5.000	5.275	2.783	3.861	167	209	264	264	278	278	292	348	376
5.000	23.2	3.919	0.478	5.000	5.000	6.791	3.537	3.861	212	265	336	336	354	354	371	442	477
5.500	15.5	4.825	0.275	5.500	5.500	4.514	2.255	2.861	135	169	214	214	226	226	237	282	304
5.500	17.0	4.767	0.304	5.500	5.500	4.962	2.482	2.861	149	186	236	236	248	248	261	310	335
5.500	20.0	4.653	0.361	5.500	5.500	5.828	3.014	3.361	181	226	286	286	301	301	316	377	407
5.500	23.0	4.545	0.415	5.500	5.500	6.630	3.410	3.361	205	256	324	324	341	341	358	426	460
6.625	24.0	5.796	0.352	6.625	6.625	6.937	3.470	2.861	208	260	330	330	347	347	364	434	468
6.625	28.0	5.666	0.417	6.625	6.625	8.133	4.262	3.861	256	320	405	405	426	426	448	533	575
6.625	32.0	5.550	0.475	6.625	6.625	9.177	4.780	3.861	287	359	454	454	478	478	502	598	645
7.000	23.0	6.241	0.317	7.000	7.000	6.656	3.333	2.861	200	250	317	317	333	333	350	417	450
7.000	26.0	6.151	0.362	7.000	7.000	7.549	3.985	3.861	239	299	379	379	399	399	418	498	538
7.000	29.0	6.059	0.408	7.000	7.000	8.449	4.426	3.861	266	332	420	420	443	443	465	553	598
7.000	32.0	5.969	0.453	7.000	7.000	9.317	4.962	4.250	298	372	471	471	496	496	521	620	670
7.625	33.7	6.640	0.430	7.625	7.625	9.720	5.134	4.145	308	385	488	488	513	513	539	642	693
7.625	39.0	6.500	0.500	7.625	7.625	11.192	5.860	4.145	352	440	557	557	586	586	615	733	791
8.625	28.0	7.892	0.304	8.625	8.625	7.947	3.966	3.205	238	297	377	377	397	397	416	496	535
8.625	32.0	7.796	0.352	8.625	8.625	9.149	4.724	4.145	283	354	449	449	472	472	496	591	638
9.625	53.5	8.379	0.545	9.625	9.625	15.547	8.470	5.195	508	635	805	805	847	847	889	1059	1143
10.750	45.5	9.794	0.400	10.750	10.750	13.006	6.768	3.861	406	508	643	643	677	677	711	846	914
10.750	51.0	9.694	0.450	10.750	10.750	14.561	7.673	4.145	460	575	729	729	767	767	806	959	1036
10.750	55.5	9.604	0.495	10.750	10.750	15.947	8.362	4.145	502	627	794	794	836	836	878	1045	1129

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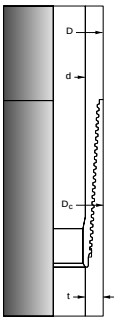
Hunting Interlock, Inc.—FLUSH SEAL-LOCK

Type: Flush Seal: Metal-to-metal

D	w	d	t	D_c	D_{sc}	A_t	A_p	L_{sc}	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	14.9	4.283	0.296	5.000	....	4.374	2.730	3.765	164	205	259	259	259	273	287	341	369
5.000	17.9	4.151	0.362	5.000	....	5.275	3.454	4.303	207	259	328	328	328	345	363	432	466
5.000	23.1	3.919	0.478	5.000	....	6.791	4.581	4.827	275	344	435	435	435	458	481	573	618
5.500	15.3	4.825	0.275	5.500	....	4.514	2.709	3.373	163	203	257	257	257	271	284	339	366
5.500	16.9	4.767	0.304	5.500	....	4.962	3.249	4.243	195	244	309	309	309	325	341	406	439
5.500	22.5	4.545	0.415	5.500	....	6.630	4.338	4.062	260	325	412	412	412	434	455	542	586
5.500	25.5	4.423	0.476	5.500	....	7.513	4.962	4.827	298	372	471	471	471	496	521	620	670
6.625	27.6	5.666	0.417	6.625	....	8.133	5.141	3.935	308	386	488	488	488	514	540	643	694
7.000	22.6	6.241	0.317	7.000	....	6.655	3.165	2.601	190	237	301	301	301	317	332	396	427
7.000	28.7	6.059	0.408	7.000	....	8.449	5.485	3.935	329	411	521	521	521	549	576	686	740
7.000	31.7	5.969	0.453	7.000	....	9.317	6.315	4.639	379	474	600	600	600	632	663	789	853
7.000	34.6	5.879	0.498	7.000	....	10.172	6.913	5.070	415	518	657	657	657	691	726	864	933
7.000	48.9	5.415	0.730	7.000	....	14.379	9.917	6.716	595	744	942	942	942	992	1041	1240	1339
7.625	29.0	6.750	0.375	7.625	....	8.541	5.456	3.649	327	409	518	518	518	546	573	682	737
7.625	33.0	6.640	0.430	7.625	....	9.720	6.312	4.155	379	473	600	600	600	631	663	789	852
7.625	38.0	6.500	0.500	7.625	....	11.192	7.607	5.270	456	571	723	723	723	761	799	951	1027
7.625	44.7	6.310	0.595	7.625	....	13.141	8.931	3.827	536	670	848	848	848	893	938	1116	1206
7.750	45.5	6.435	0.595	7.750	....	13.374	9.094	5.651	546	682	864	864	864	909	955	1137	1228
8.625	39.3	7.600	0.450	8.625	....	11.557	7.442	4.246	447	558	707	707	707	744	781	930	1005
9.625	38.9	8.679	0.395	9.625	....	11.454	7.355	3.935	441	552	699	699	699	736	772	919	993
9.625	42.7	8.599	0.435	9.625	....	12.559	7.792	4.827	468	584	740	740	740	779	818	974	1052
9.625	46.1	8.525	0.472	9.625	....	13.572	8.789	4.245	527	659	835	835	835	879	923	1099	1187
9.625	52.9	8.379	0.545	9.625	....	15.546	10.058	5.196	603	754	956	956	956	1006	1056	1257	1358
10.750	64.5	9.404	0.595	10.750	....	18.982	12.881	6.203	773	966	1224	1224	1224	1288	1353	1610	1739
11.750	58.8	10.616	0.489	11.750	....	17.300	10.791	4.245	647	809	1025	1025	1025	1079	1133	1349	1457
11.750	64.0	10.526	0.534	11.750	....	18.816	11.700	5.008	702	878	1112	1112	1112	1170	1229	1463	1580
13.375	70.6	12.191	0.514	13.375	....	20.768	13.504	5.084	810	1013	1283	1283	1283	1350	1418	1688	1823
13.625	86.8	12.219	0.625	13.625	....	25.525	17.360	5.878	1042	1302	1649	1649	1649	1736	1823	2170	2344

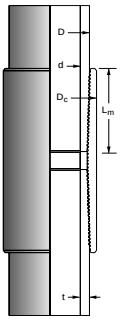


HUNTING INTERLOCK, INC. FLUSH SEAL-LOCK is a premium connection with metal-to-metal seal, hooked thread form and external torque shoulder for liner applications. It offers excellent clearance and pipe body burst. Hooked thread form and geometry provide easy make-up and eliminate radial separation between mating pin and box.

Hunting Interlock, Inc.—FS-150

Type: Coupled Seal: Metal-to-metal, threaded

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.369	0.253	5.563	5.375	3.773	3.616	3.500	217	271	344	344	362	362	380	452	488
5.000	15.0	4.283	0.296	5.563	5.375	4.374	4.218	3.500	253	316	401	401	422	422	443	527	569
5.000	18.0	4.151	0.362	5.563	5.375	5.275	5.118	3.500	307	384	486	486	512	512	537	640	691
5.000	21.4	4.001	0.437	5.563	5.375	6.264	6.108	3.500	366	458	580	580	611	611	641	763	825
5.000	23.2	3.919	0.478	5.563	5.375	6.791	6.634	3.500	398	498	630	630	663	663	697	829	896
5.000	24.1	3.875	0.500	5.563	5.375	7.069	6.912	3.500	415	518	657	657	691	691	726	864	933
5.500	15.5	4.825	0.275	6.050	5.875	4.514	4.342	3.625	260	326	412	412	434	434	456	543	586
5.500	17.0	4.767	0.304	6.050	5.875	4.962	4.790	3.625	287	359	455	455	479	479	503	599	647
5.500	20.0	4.653	0.361	6.050	5.875	5.828	5.656	3.625	339	424	537	537	566	566	594	707	764
5.500	23.0	4.545	0.415	6.050	5.875	6.630	6.457	3.625	387	484	613	613	646	646	678	807	872
6.625	20.0	5.924	0.288	7.390	7.000	5.734	5.526	4.000	332	414	525	525	553	553	580	691	746
6.625	24.0	5.796	0.352	7.390	7.000	6.937	6.729	4.000	404	505	639	639	673	673	707	841	908
6.625	28.0	5.666	0.417	7.390	7.000	8.133	7.925	4.000	475	594	753	753	792	792	832	991	1070
6.625	32.0	5.550	0.475	7.390	7.000	9.177	8.970	4.000	538	673	852	852	897	897	942	1121	1211
7.000	23.0	6.241	0.317	7.656	7.375	6.656	6.436	4.125	386	483	611	611	644	644	676	804	869
7.000	26.0	6.151	0.362	7.656	7.375	7.549	7.330	4.125	440	550	696	696	733	733	770	916	989
7.000	29.0	6.059	0.408	7.656	7.375	8.449	8.230	4.125	494	617	782	782	823	823	864	1029	1111
7.000	32.0	5.969	0.453	7.656	7.375	9.317	9.098	4.125	546	682	864	864	910	910	955	1137	1228
10.750	45.5	9.794	0.400	11.750	11.250	13.006	12.669	4.810	760	950	1204	1204	1267	1267	1330	1584	1710
10.750	51.0	9.694	0.450	11.750	11.250	14.561	14.224	4.810	853	1067	1351	1351	1422	1422	1494	1778	1920
10.750	55.5	9.604	0.495	11.750	11.250	15.947	15.610	4.810	937	1171	1483	1483	1561	1561	1639	1951	2107
10.750	60.7	9.504	0.545	11.750	11.250	17.473	17.135	4.810	1028	1285	1628	1628	1714	1714	1799	2142	2313
11.750	47.0	10.844	0.375	12.750	12.250	13.401	13.032	4.810	782	977	1238	1238	1303	1303	1368	1629	1759
11.750	54.0	10.724	0.435	12.750	12.250	15.463	15.094	4.810	906	1132	1434	1434	1509	1509	1585	1887	2038
11.750	60.0	10.616	0.489	12.750	12.250	17.300	16.931	4.810	1016	1270	1608	1608	1693	1693	1778	2116	2286
13.375	54.5	12.459	0.380	14.375	14.188	15.514	15.094	4.810	906	1132	1434	1434	1509	1509	1585	1887	2038
13.375	61.0	12.359	0.430	14.375	14.188	17.487	17.067	4.810	1024	1280	1621	1621	1707	1707	1792	2133	2304
13.375	68.0	12.259	0.480	14.375	14.188	19.445	19.025	4.810	1142	1427	1807	1807	1903	1903	1998	2378	2568
13.375	72.0	12.191	0.514	14.375	14.188	20.768	20.348	4.810	1221	1526	1933	1933	2035	2035	2137	2543	2747



HUNTING INTERLOCK, INC. FS-150 is ideal for high-grade steels and chrome, and applications involving jump-out and loading concerns. True 90° load flank and large radius stab flank create free-spinning, low-interference thread design to ensure low hoop stresses and reduced running times. Coupling strength nears that of pipe body.

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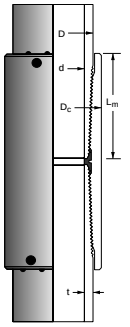
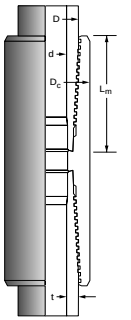


HUNTING INTERLOCK, INC. MMS 8 ROUND for internally plastic-coated casing. Teflon center ring allows for turbulent-free flow. When used with pin end finish specs, a gas-tight seal is provided, along with 100% holiday-free connection. Precise make-up is achieved by a proprietary coupling and pin gauging system. It is manufactured to ½ of API tolerances to ensure ideal match with API 8 round pins.

Hunting Interlock, Inc.—MMS 8 ROUND

Type: Coupled **Seal: Resilient, threaded**

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.396	0.253	5.563	5.375	3.773	2.670	3.775	138	182	201	241	254	254	266	317	342
5.000	15.0	4.283	0.296	5.563	5.375	4.374	3.271	3.775	169	223	246	295	311	311	326	388	420
5.000	18.0	4.151	0.362	5.563	5.375	5.275	4.171	3.775	215	284	314	376	396	396	416	495	535
5.000	21.4	4.126	0.437	5.563	5.375	6.264	5.161	3.775	266	352	389	466	490	490	515	613	662
5.000	23.2	4.044	0.478	5.563	5.375	6.791	5.687	3.775	293	388	428	513	540	540	567	675	729
5.000	24.1	4.000	0.500	5.563	5.375	7.069	5.965	3.775	307	407	449	538	567	567	595	708	765
5.500	15.5	4.825	0.275	6.050	5.875	4.514	3.299	3.900	164	217	239	298	306	313	329	392	423
5.500	17.0	4.767	0.304	6.050	5.875	4.962	3.747	3.900	186	247	272	338	348	356	374	445	481
5.500	20.0	4.653	0.361	6.050	5.875	5.828	4.613	3.900	229	304	334	416	428	438	460	548	592
5.500	23.0	4.545	0.415	6.050	5.875	6.630	5.414	3.900	269	356	392	489	502	514	540	643	694
6.625	20.0	5.924	0.288	7.390	7.000	5.734	4.267	4.275	200	266	290	369	375	405	426	500	547
6.625	24.0	5.796	0.352	7.390	7.000	6.937	5.470	4.275	256	340	372	473	481	520	546	641	702
6.625	28.0	5.666	0.417	7.390	7.000	8.133	6.666	4.275	312	415	454	576	586	633	665	781	855
6.625	32.0	5.550	0.475	7.390	7.000	9.177	7.710	4.275	361	480	525	666	678	732	769	904	989
7.000	23.0	6.241	0.317	7.656	7.375	6.656	5.105	4.400	235	313	341	435	442	479	505	590	655
7.000	26.0	6.151	0.362	7.656	7.375	7.549	5.998	4.400	276	367	401	511	519	563	593	693	769
7.000	29.0	6.059	0.408	7.656	7.375	8.449	6.899	4.400	318	423	461	587	597	648	683	797	885
7.000	32.0	5.969	0.453	7.656	7.375	9.317	7.766	4.400	358	476	519	661	672	729	768	897	996
7.000	35.0	5.879	0.498	7.656	7.375	10.172	8.622	4.400	397	528	576	734	746	809	853	996	1106
7.000	38.0	5.795	0.540	7.656	7.375	10.959	9.408	4.400	433	576	629	801	814	883	931	1087	1207
7.625	26.4	6.844	0.328	8.500	8.125	7.519	5.828	4.525	260	346	377	482	490	532	560	654	733
7.625	29.7	6.750	0.375	8.500	8.125	8.541	6.850	4.525	306	407	443	567	575	625	659	769	861
7.625	33.7	6.640	0.430	8.500	8.125	9.720	8.029	4.525	358	477	519	664	674	733	772	901	1009
7.625	39.0	6.500	0.500	8.500	8.125	11.192	9.501	4.525	424	564	614	786	798	867	914	1066	1194
7.625	42.8	6.376	0.562	8.500	8.125	12.470	10.779	4.525	481	640	696	891	906	984	1037	1210	1355
7.625	45.3	6.310	0.595	8.500	8.125	13.141	11.450	4.525	511	680	740	947	962	1045	1101	1285	1439
7.625	47.1	6.250	0.625	8.500	8.125	13.745	12.054	4.525	538	716	779	997	1013	1100	1159	1353	1515
8.625	32.0	7.796	0.352	9.625	9.125	9.149	7.234	4.900	313	417	452	583	591	643	678	791	887
8.625	36.0	7.700	0.400	9.625	9.125	10.336	8.421	4.900	364	486	526	678	688	749	789	921	1032
8.625	40.0	7.600	0.450	9.625	9.125	11.557	9.642	4.900	417	556	603	776	788	858	904	1055	1182
8.625	44.0	7.500	0.500	9.625	9.125	12.763	10.848	4.900	469	626	678	874	887	965	1017	1186	1330
8.625	49.0	7.386	0.557	9.625	9.125	14.118	12.203	4.900	528	704	763	983	997	1085	1144	1335	1496
9.625	36.0	8.765	0.352	10.625	10.125	10.254	8.116	5.150	339	453	489	634	643	700	738	861	966
9.625	40.0	8.679	0.395	10.625	10.125	11.454	9.315	5.150	389	520	561	727	737	804	847	988	1108
9.625	43.5	8.599	0.435	10.625	10.125	12.559	10.420	5.150	436	582	628	813	825	899	948	1105	1240
9.625	47.0	8.525	0.472	10.625	10.125	13.572	11.434	5.150	478	638	689	893	905	987	1040	1213	1361
9.625	53.5	8.379	0.545	10.625	10.125	15.547	13.408	5.150	560	748	808	1047	1062	1157	1220	1422	1595
9.625	58.4	8.279	0.595	10.625	10.125	16.879	14.741	5.150	616	823	888	1151	1167	1272	1341	1564	1754



HUNTING INTERLOCK, INC. SEAL-LOCK APEX is a new threaded and coupled non-upset premium connection designed to provide internal and external pressure integrity under extreme loads. APEX utilizes a patented sealing thread form and a metal-to-metal seal to provide performance ratings that equal or exceed pipe body ratings in tension, internal and external pressure. A negative load-flank thread and advanced connection geometry results in smooth trouble-free running.

Hunting Interlock, Inc.—SEAL-LOCK APEX

Type: Coupled **Seal: Metal-to-metal**

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	15.0	4.443	0.296	5.750	....	....	6.936	4.018	416	520	659	659	694	694	728	867	936
5.000	18.0	4.357	0.362	5.750	....	....	6.936	4.018	416	520	659	659	694	694	728	867	936
5.000	20.3	4.283	0.408	5.750	....	....	6.936	4.018	416	520	659	659	694	694	728	867	936
5.000	21.4	4.238	0.437	5.750	....	....	6.936	4.018	416	520	659	659	694	694	728	867	936
5.000	23.2	4.177	0.478	5.750	....	....	6.936	4.018	416	520	659	659	694	694	728	867	936
5.000	24.1	4.145	0.500	5.750	....	....	6.936	4.018	416	520	659	659	694	694	728	867	936
5.500	17.0	4.892	0.304	6.250	....	....	7.601	4.018	456	570	722	722	760	760	798	950	1026
5.500	20.0	4.872	0.361	6.250	....	....	7.601	4.018	456	570	722	722	760	760	798	950	1026
5.500	23.0	4.809	0.415	6.250	....	....	7.601	4.018	456	570	722	722	760	760	798	950	1026
5.500	26.0	4.727	0.476	6.250	....	....	7.601	4.018	456	570	722	722	760	760	798	950	1026
5.500	26.8	4.692	0.500	6.250	....	....	7.601	4.018	456	570	722	722	760	760	798	950	1026
5.500	28.4	4.646	0.530	6.250	....	....	7.601	4.018	456	570	722	722	760	760	798	950	1026
5.500	29.7	4.594	0.562	6.250	....	....	7.601	4.018	456	570	722	722	760	760	798	950	1026
6.625	28.0	5.791	0.417	7.500	....	....	11.813	5.446	709	886	1122	1122	1181	1181	1240	1477	1595
6.625	32.0	5.755	0.475	7.500	....	....	11.813	5.446	709	886	1122	1122	1181	1181	1240	1477	1595
6.625	33.0	....	0.500	7.500	....	....	11.813	5.446	709	886	1122	1122	1181	1181	1240	1477	1595
6.625	34.0	5.507	0.525	7.500	....	....	11.813	5.446	709	886	1122	1122	1181	1181	1240	1477	1595
6.625	36.7	....	0.562	7.500	....	....	11.813	5.446	709	886	1122	1122	1181	1181	1240	1477	1595
6.625	40.2	....	0.625	7.500	....	....	11.813	5.446	709	886	1122	1122	1181	1181	1240	1477	1595
6.625	43.7	5.507	0.687	7.500	....	....	11.813	5.446	709	886	1122	1122	1181	1181	1240	1477	1595
6.625	47.1	5.432	0.750	7.500	....	....	11.813	5.446	709	886	1122	1122	1181	1181	1240	1477	1595
7.000	32.0	6.122	0.453	8.000	....	....	14.045	5.446	843	1053	1334	1334	1405	1405	1475	1756	1896
7.000	35.0	6.105	0.498	8.000	....	....	14.045	5.446	843	1053	1334	1334	1405	1405	1475	1756	1896
7.000	38.0	6.047	0.540	8.000	....	....	14.045	5.446	843	1053	1334	1334	1405	1405	1475	1756	1896
7.000	41.0	5.980	0.590	8.000	....	....	14.045	5.446	843	1053	1334	1334	1405	1405	1475	1756	1896
7.000	42.7	5.935	0.625	8.000	....	....	14.045	5.446	843	1053	1334	1334	1405	1405	1475	1756	1896
7.000	44.0	5.916	0.640	8.000	....	....	14.045	5.446	843	1053	1334	1334	1405	1405	1475	1756	1896
7.000	46.4	5.858	0.687	8.000	....	....	14.045	5.446	843	1053	1334	1334	1405	1405	1475	1756	1896
7.000	49.5	5.806	0.730	8.000	....	....	14.045	5.446	843	1053	1334	1334	1405	1405	1475	1756	1896
7.000	50.1	5.783	0.750	8.000	....	....	14.045	5.446	843	1053	1334	1334	1405	1405	1475	1756	1896
7.625	39.0	6.651	0.500	8.750	....	....	16.960	5.446	1018	1272	1611	1611	1696	1696	1781	2120	2290
7.625	42.8	6.648	0.562	8.750	....	....	16.960	5.446	1018	1272	1611	1611	1696	1696	1781	2120	2290
7.625	45.3	6.608	0.595	8.750	....	....	16.960	5.446	1018	1272	1611	1611	1696	1696	1781	2120	2290
7.625	47.1	6.542	0.625	8.750	....	....	16.960	5.446	1018	1272	1611	1611	1696	1696	1781	2120	2290
7.625	51.2	6.454	0.687	8.750	....	....	16.960	5.446	1018	1272	1611	1611	1696	1696	1781	2120	2290
7.625	52.8	6.422	0.712	8.750	....	....	16.960	5.446	1018	1272	1611	1611	1696	1696	1781	2120	2290
7.625	55.3	6.354	0.750	8.750	....	....	16.960	5.446	1018	1272	1611	1611	1696	1696	1781	2120	2290
7.625	59.1	6.300	0.812	8.750	....	....	16.960	5.446	1018	1272	1611	1611	1696	1696	1781	2120	2290
7.750	46.1	6.686	0.595	8.600	....	....	13.471	5.446	808	1010	1280	1280	1347	1347	1414	1684	1819
8.625	40.0	7.725	0.450	9.625	....	....	17.154	5.446	1029	1287	1630	1630	1715	1715	1801	2144	2316
8.625	44.0	7.625	0.500	9.625	....	....	17.154	5.446	1029	1287	1630	1630	1715	1715	1801	2144	2316
8.625	49.0	7.625	0.557	9.625	....	....	17.154	5.446	1029	1287	1630	1630	1715	1715	1801	2144	2316
8.625	52.0	7.576	0.595	9.625	....	....	17.154	5.446	1029	1287	1630	1630	1715	1715	1801	2144	2316
8.625	54.0	7.576	0.625	9.625	....	....	17.154	5.446	1029	1287	1630	1630	1715	1715	1801	2144	2316
8.625	58.0	7.461	0.687	9.625	....	....	17.154	5.446	1029	1287	1630	1630	1715	1715	1801	2144	2316
8.625	63.5	7.387	0.750	9.625	....	....	17.154	5.446	1029	1287	1630	1630	1715	1715	1801	2144	2316

Table continues

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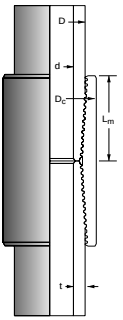
Hunting Interlock, Inc.—SEAL-LOCK APEX (continued)

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
9.625	43.5	8.728	0.435	10.625	....	....	19.097	5.446	1146	1432	1814	1814	1910	1910	2005	2387	2578
9.625	47.0	8.678	0.472	10.625	....	....	19.097	5.446	1146	1432	1814	1814	1910	1910	2005	2387	2578
9.625	53.5	8.653	0.545	10.625	....	....	19.097	5.446	1146	1432	1814	1814	1910	1910	2005	2387	2578
9.625	58.4	8.608	0.595	10.625	....	....	19.097	5.446	1146	1432	1814	1814	1910	1910	2005	2387	2578
9.625	64.9	8.568	0.672	10.625	....	....	19.097	5.446	1146	1432	1814	1814	1910	1910	2005	2387	2578
9.625	70.3	8.528	0.734	10.625	....	....	19.097	5.446	1146	1432	1814	1814	1910	1910	2005	2387	2578
9.625	71.6	8.478	0.750	10.625	....	....	19.097	5.446	1146	1432	1814	1814	1910	1910	2005	2387	2578
9.750	59.2	8.726	0.595	10.625	....	....	17.248	5.446	1035	1294	1639	1639	1725	1725	1811	2156	2328
9.875	62.8	8.726	0.625	10.625	....	....	16.351	5.446	981	1226	1553	1553	1635	1635	1717	2044	2207
10.750	51.0	9.850	0.450	11.750	....	....	21.286	5.446	1277	1596	2022	2022	2129	2129	2235	2661	2874
10.750	55.5	9.760	0.495	11.750	....	....	21.286	5.446	1277	1596	2022	2022	2129	2129	2235	2661	2874
10.750	60.7	9.759	0.545	11.750	....	....	21.286	5.446	1277	1596	2022	2022	2129	2129	2235	2661	2874
10.750	65.7	9.674	0.595	11.750	....	....	21.286	5.446	1277	1596	2022	2022	2129	2129	2235	2661	2874
10.750	71.1	9.624	0.650	11.750	....	....	21.286	5.446	1277	1596	2022	2022	2129	2129	2235	2661	2874
10.750	75.9	9.549	0.700	11.750	....	....	21.286	5.446	1277	1596	2022	2022	2129	2129	2235	2661	2874
10.750	80.8	9.474	0.750	11.750	....	....	21.286	5.446	1277	1596	2022	2022	2129	2129	2235	2661	2874
10.750	91.2	9.032	0.859	11.800	....	....	33.696	8.052	2022	2527	3201	3201	3370	3370	3538	4212	4549
10.750	97.1	9.004	0.922	11.800	....	....	33.696	8.052	2022	2527	3201	3201	3370	3370	3538	4212	4549
10.750	102.9	8.929	0.984	11.800	....	....	33.696	8.052	2022	2527	3201	3201	3370	3370	3538	4212	4549
10.750	109.0	8.804	1.050	11.800	....	....	33.696	8.052	2022	2527	3201	3201	3370	3370	3538	4212	4549
11.750	60.0	10.772	0.489	12.750	....	....	23.241	5.446	1394	1743	2208	2208	2324	2324	2440	2905	3138
11.750	65.0	10.682	0.534	12.750	....	....	23.241	5.446	1394	1743	2208	2208	2324	2324	2440	2905	3138
11.750	71.0	10.684	0.582	12.750	....	....	23.241	5.446	1394	1743	2208	2208	2324	2324	2440	2905	3138
11.750	75.4	10.624	0.625	12.750	....	....	23.241	5.446	1394	1743	2208	2208	2324	2324	2440	2905	3138
11.750	78.8	10.587	0.656	12.750	....	....	23.241	5.446	1394	1743	2208	2208	2324	2324	2440	2905	3138
11.750	82.6	10.542	0.691	12.750	....	....	23.241	5.446	1394	1743	2208	2208	2324	2324	2440	2905	3138
11.750	87.2	10.481	0.734	12.750	....	....	23.241	5.446	1394	1743	2208	2208	2324	2324	2440	2905	3138
11.875	71.8	10.825	10.625	12.750	....	....	20.976	5.446	1259	1573	1993	1993	2098	2098	2202	2622	2832
13.375	68.0	12.415	0.480	14.375	....	....	26.407	5.446	1584	1981	2509	2509	2641	2641	2773	3301	3565
13.375	72.0	12.422	0.514	14.375	....	....	26.407	5.446	1584	1981	2509	2509	2641	2641	2773	3301	3565
13.375	77.0	12.397	0.550	14.375	....	....	26.407	5.446	1584	1981	2509	2509	2641	2641	2773	3301	3565
13.375	80.7	12.337	0.580	14.375	....	....	26.407	5.446	1584	1981	2509	2509	2641	2641	2773	3301	3565
13.375	86.0	12.275	0.625	14.375	....	....	26.407	5.446	1584	1981	2509	2509	2641	2641	2773	3301	3565
13.375	91.0	12.197	0.660	14.375	....	....	26.407	5.446	1584	1981	2509	2509	2641	2641	2773	3301	3565
13.375	92.5	12.197	0.672	14.375	....	....	26.407	5.446	1584	1981	2509	2509	2641	2641	2773	3301	3565
13.625	88.2	12.497	0.625	14.375	....	....	23.094	5.446	1386	1732	2194	2194	2309	2309	2425	2887	3118

Hunting Interlock, Inc.—SEAL-LOCK BOSS

Type: Coupled, non-upset **Seal:** Threaded

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
9.625	40.0	8.679	0.395	10.625	....	11.454	11.454	4.671	687	859	1088	1088	1145	1145	1203	1432	1546
9.625	43.5	8.599	0.435	10.625	....	12.559	12.559	4.671	754	942	1193	1193	1256	1256	1319	1570	1695
9.625	47.0	8.525	0.472	10.625	....	13.572	13.572	4.671	814	1018	1289	1289	1357	1357	1425	1697	1832
9.625	53.5	8.500	0.545	10.625	....	15.546	15.546	4.671	933	1166	1477	1477	1555	1555	1632	1943	2099
9.625	59.4	8.251	0.609	10.625	....	17.250	17.250	4.671	1035	1294	1639	1639	1725	1725	1811	2156	2329
9.750	59.2	8.404	0.595	10.625	....	17.113	17.113	5.871	1027	1283	1626	1626	1711	1711	1797	2139	2310
9.875	62.8	8.500	0.625	10.625	....	18.162	17.797	7.071	1068	1335	1691	1691	1780	1780	1869	2225	2403
10.750	45.5	9.875	0.400	11.750	....	13.006	13.006	4.671	780	975	1236	1236	1301	1301	1366	1626	1756
10.750	51.0	9.694	0.450	11.750	....	14.561	14.561	4.671	874	1092	1383	1383	1456	1456	1529	1820	1966
10.750	55.5	9.604	0.495	11.750	....	15.947	15.947	4.671	957	1196	1515	1515	1595	1595	1674	1993	2153
10.750	60.7	9.504	0.545	11.750	....	17.473	17.473	4.671	1048	1310	1660	1660	1747	1747	1835	2184	2359
10.750	65.7	9.500	0.595	11.750	....	18.982	18.982	4.671	1139	1424	1803	1803	1898	1898	1993	2373	2563
10.750	73.2	9.250	0.672	11.750	....	21.276	19.841	4.671	1190	1488	1885	1885	1984	1984	2083	2480	2679
10.750	79.2	9.126	0.734	11.750	....	23.096	19.841	4.671	1190	1488	1885	1885	1984	1984	2083	2480	2679
10.750	80.8	9.094	0.750	11.750	....	23.562	19.841	4.671	1190	1488	1885	1885	1984	1984	2083	2480	2679
11.750	47.0	10.844	0.375	12.750	....	13.401	13.401	4.671	804	1005	1273	1273	1340	1340	1407	1675	1809
11.750	54.0	10.724	0.435	12.750	....	15.463	15.463	4.671	928	1160	1469	1469	1546	1546	1624	1933	2088
11.750	60.0	10.625	0.489	12.750	....	17.300	17.300	4.671	1038	1297	1643	1643	1730	1730	1816	2162	2335
11.750	65.0	10.625	0.534	12.750	....	18.816	18.816	4.671	1129	1411	1788	1788	1882	1882	1976	2352	2540
11.750	71.0	10.430	0.582	12.750	....	20.420	20.420	4.671	1225	1531	1940	1940	2042	2042	2144	2552	2757
11.875	71.8	10.625	0.582	12.750	....	20.648	20.648	5.871	1239	1549	1962	1962	2065	2065	2168	2581	2788
13.375	61.0	12.359	0.430	14.375	....	17.487	17.487	5.094	1049	1312	1661	1661	1749	1749	1836	2186	2361
13.375	68.0	12.259	0.480	14.375	....	19.445	19.445	5.094	1167	1458	1847	1847	1945	1945	2042	2431	2625
13.375	72.0	12.250	0.514	14.375	....	20.768	20.768	5.094	1246	1558	1973	1973	2077	2077	2181	2596	2804
13.375	77.0	12.119	0.550	14.375	....	22.160	22.160	5.094	1330	1662	2105	2105	2216	2216	2327	2770	2992
13.375	85.0	12.003	0.608	14.375	....	24.386	24.025	5.094	1442	1802	2282	2282	2403	2403	2523	3003	3243
13.375	86.0	11.969	0.625	14.375	....	25.035	24.025	5.094	1442	1802	2282	2282	2403	2403	2523	3003	3243
13.625	88.2	12.250	0.625	14.375	....	25.525	24.025	6.094	1442	1802	2282	2282	2403	2403	2523	3003	3243
14.000	82.5	12.720	0.562	15.000	....	23.726	23.726	5.190	1424	1779	2254	2254	2373	2373	2491	2966	3203
14.000	94.8	12.500	0.656	15.000	....	27.500	25.726	5.190	1544	1929	2444	2444	2573	2573	2701	3216	3473
14.000	99.0	12.468	0.688	15.000	....	28.773	25.726	5.190	1544	1929	2444	2444	2573	2573	2701	3216	3473
14.000	114.0	12.244	0.800	15.000	....	33.175	25.726	5.190	1544	1929	2444	2444	2573	2573	2701	3216	3473
16.000	65.0	15.062	0.375	17.000	....	18.408	18.408	5.254	1104	1381	1749	1749	1841	1841	1933	2301	2485
16.000	75.0	14.936	0.438	17.000	....	21.414	21.414	5.254	1285	1606	2034	2034	2141	2141	2248	2677	2891
16.000	84.0	14.822	0.495	17.000	....	24.112	24.112	5.254	1447	1808	2291	2291	2411	2411	2532	3014	3255
16.000	95.0	14.680	0.566	17.000	....	27.444	27.444	5.254	1647	2058	2607	2607	2744	2744	2882	3430	3705
16.000	104.0	14.562	0.625	17.000	....	30.189	29.118	5.254	1747	2184	2766	2766	2912	2912	3057	3640	3931
16.000	109.0	14.500	0.656	17.000	....	31.622	29.118	5.254	1747	2184	2766	2766	2912	2912	3057	3640	3931
16.000	128.0	14.250	0.781	17.000	....	37.341	29.118	5.254	1747	2184	2766	2766	2912	2912	3057	3640	3931
18.625	87.5	17.567	0.435	19.625	....	24.858	24.858	5.318	1491	1864	2362	2362	2486	2486	2610	3107	3356
18.625	96.5	17.465	0.486	19.625	....	27.695	27.695	5.318	1662	2077	2631	2631	2769	2769	2908	3462	3739
18.625	99.0	17.437	0.500	19.625	....	28.471	28.471	5.318	1708	2135	2705	2705	2847	2847	2989	3559	3844
18.625	105.0	17.375	0.531	19.625	....	30.184	30.184	5.318	1811	2264	2867	2867	3018	3018	3169	3773	4075
18.625	112.0	17.279	0.579	19.625	....	32.825	32.825	5.318	1970	2462	3118	3118	3283	3283	3447	4103	4431
18.625	138.0	16.997	0.720	19.625	....	40.500	34.232	5.318	2054	2567	3252	3252	3423	3423	3594	4279	4621
20.000	94.0	18.936	0.438	21.000	....	26.918	26.918	5.563	1615	2019	2557	2557	2692	2692	2826	3365	3634
20.000	106.5	18.812	0.500	21.000	....	30.631	30.631	5.563	1838	2297	2910	2910	3063	3063	3216	3829	4135
20.000	131.0	18.562	0.625	21.000	....	38.043	37.367	5.563	2242	2803	3550	3550	3737	3737	3924	4671	5045
20.000	133.0	18.542	0.635	21.000	....	38.631	37.367	5.563	2242	2803	3550	3550	3737	3737	3924	4671	5045
20.000	147.0	18.394	0.709	21.000	....	42.969	37.367	5.563	2242	2803	3550	3550	3737	3737	3924	4671	5045
20.000	169.0	18.188	0.812	21.000	....	48.948	37.367	5.563	2242	2803	3550	3550	3737	3737	3924	4671	5045



HUNTING INTERLOCK, INC. SEAL-LOCK BOSS is a new threaded and coupled casing connection that is cost-competitive with API Buttress. It uses a patented hooked thread design for sealing and unique pin-to-pin torque shoulder for enhanced compressive loading. Rugged thread form and geometry result in deep stabbing and quick make-up without cross threading.

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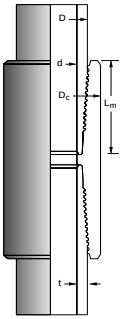
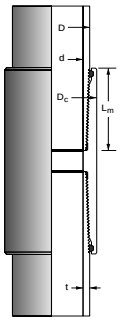


HUNTING INTERLOCK, INC. SEAL-LOCK HC threaded and coupled connection is for light to mid-weight tubulars. Features include gas tight metal-to-metal seal, torque shoulder and hooked threadform. Geometry allows multiple make and breaks and virtually eliminates cross threading. Stresses are minimized to provide superior performance in H_2S and CO_2.

Hunting Interlock, Inc.—SEAL-LOCK HC

Type: Coupled **Seal: Metal-to-metal**

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_p	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.369	0.253	5.563	....	3.773	3.773	3.352	226	283	358	358	377	377	396	472	509
5.000	15.0	4.283	0.296	5.563	....	4.374	4.299	3.352	258	322	408	408	430	430	451	537	580
5.000	18.0	4.151	0.362	5.563	....	5.275	4.289	3.352	257	322	407	407	429	429	450	536	579
5.500	15.5	4.825	0.275	6.050	....	4.514	4.514	3.582	271	339	429	429	451	451	474	564	609
5.500	17.0	4.767	0.304	6.050	....	4.962	4.962	3.582	298	372	471	471	496	496	521	620	670
5.500	20.0	4.653	0.361	6.050	....	5.828	5.515	3.582	331	414	524	524	552	552	579	689	745
5.500	23.0	4.545	0.415	6.050	....	6.630	5.515	3.582	331	414	524	524	552	552	579	689	745
6.625	20.0	5.924	0.288	7.390	....	5.734	6.937	3.931	416	520	659	659	694	694	728	867	936
6.625	24.0	5.796	0.352	7.390	....	6.937	6.937	3.931	416	520	659	659	694	694	728	867	936
6.625	28.0	5.666	0.417	7.390	....	8.133	8.125	3.931	488	609	772	772	813	813	853	1016	1097
6.625	32.0	5.550	0.475	7.390	....	9.177	8.128	3.931	488	610	772	772	813	813	853	1016	1097
7.000	23.0	6.250	0.317	7.656	....	6.655	6.655	4.100	399	499	632	632	666	666	699	832	898
7.000	26.0	6.151	0.362	7.656	....	7.549	7.549	4.100	453	566	717	717	755	755	793	944	1019
7.000	29.0	6.059	0.408	7.656	....	8.449	8.449	4.100	507	634	803	803	845	845	887	1056	1141
7.000	32.0	6.000	0.453	7.656	....	9.317	9.313	4.100	559	698	885	885	931	931	978	1164	1257
7.000	35.0	5.879	0.498	7.656	....	10.172	9.313	4.100	559	698	885	885	931	931	978	1164	1257
7.000	38.0	5.795	0.540	7.656	....	10.959	9.313	4.100	559	698	885	885	931	931	978	1164	1257
7.000	41.0	5.695	0.590	7.656	....	11.881	9.313	4.100	559	698	885	885	931	931	978	1164	1257
7.625	26.4	6.844	0.328	8.500	....	7.519	7.519	4.312	451	564	714	714	752	752	789	940	1015
7.625	29.7	6.750	0.375	8.500	....	8.541	8.541	4.312	512	641	811	811	854	854	897	1068	1153
7.625	33.7	6.640	0.430	8.500	....	9.720	9.720	4.312	583	729	923	923	972	972	1021	1215	1312
7.625	39.0	6.500	0.500	8.500	....	11.192	11.192	4.312	672	839	1063	1063	1119	1119	1175	1399	1511
7.625	45.3	6.310	0.595	8.500	....	13.141	11.212	4.312	673	841	1065	1065	1121	1121	1177	1402	1514
7.750	46.1	6.500	0.595	8.600	....	13.374	13.010	4.312	781	976	1236	1236	1301	1301	1366	1626	1756
8.625	32.0	7.875	0.352	9.625	....	9.149	9.149	4.772	549	686	869	869	915	915	961	1144	1235
8.625	36.0	7.700	0.400	9.625	....	10.336	10.336	4.772	620	775	982	982	1034	1034	1085	1292	1395
8.625	40.0	7.625	0.450	9.625	....	11.557	11.557	4.772	693	867	1098	1098	1156	1156	1213	1445	1560
8.625	44.0	7.500	0.500	9.625	....	12.763	12.763	4.772	766	957	1212	1212	1276	1276	1340	1595	1723
8.625	49.0	7.386	0.557	9.625	....	14.118	14.118	4.772	847	1059	1341	1341	1412	1412	1482	1765	1906
9.625	36.0	8.765	0.352	10.625	....	10.254	10.254	4.772	615	769	974	974	1025	1025	1077	1282	1384
9.625	40.0	8.750	0.395	10.625	....	11.454	11.454	4.772	687	859	1088	1088	1145	1145	1203	1432	1546
9.625	43.5	8.625	0.435	10.625	....	12.559	12.559	4.772	754	942	1193	1193	1256	1256	1319	1570	1695
9.625	47.0	8.625	0.472	10.625	....	13.572	13.572	4.772	814	1018	1289	1289	1357	1357	1425	1697	1832
9.625	53.5	8.500	0.545	10.625	....	15.546	15.546	4.772	933	1166	1477	1477	1555	1555	1632	1943	2099
9.750	59.2	8.500	0.595	10.625	....	17.113	17.113	5.972	1027	1283	1626	1626	1711	1711	1797	2139	2310
9.875	62.8	8.500	0.625	10.625	....	18.162	18.162	7.172	1090	1362	1725	1725	1816	1816	1907	2270	2452
10.750	40.5	9.894	0.350	11.750	....	11.435	11.435	4.772	686	858	1086	1086	1144	1144	1201	1429	1544
10.750	45.5	9.875	0.400	11.750	....	13.006	13.006	4.772	780	975	1236	1236	1301	1301	1366	1626	1756
10.750	51.0	9.694	0.450	11.750	....	14.561	14.561	4.772	874	1092	1383	1383	1456	1456	1529	1820	1966
10.750	55.5	9.625	0.495	11.750	....	15.947	15.947	4.772	957	1196	1515	1515	1595	1595	1674	1993	2153
10.750	60.7	9.504	0.545	11.750	....	17.473	17.473	4.772	1048	1310	1660	1660	1747	1747	1835	2184	2359
10.750	65.7	9.504	0.595	11.750	....	18.982	18.982	4.772	1139	1424	1803	1803	1898	1898	1993	2373	2563
11.750	47.0	10.844	0.375	12.750	....	13.401	13.401	4.801	804	1005	1273	1273	1340	1340	1407	1675	1809
11.750	54.0	10.724	0.435	12.750	....	15.463	15.463	4.801	928	1160	1469	1469	1546	1546	1624	1933	2088
11.750	60.0	10.625	0.489	12.750	....	17.300	17.300	4.801	1038	1298	1644	1644	1730	1730	1817	2163	2336
11.750	65.0	10.625	0.534	12.750	....	18.816	18.816	4.801	1129	1411	1788	1788	1882	1882	1976	2352	2540
11.750	66.7	10.500	0.547	12.750	....	19.252	19.252	4.801	1155	1444	1829	1829	1925	1925	2021	2407	2599
11.750	71.0	10.430	0.582	12.750	....	20.420	20.420	4.801	1225	1532	1940	1940	2042	2042	2144	2553	2757
11.750	73.6	10.376	0.609	12.750	....	21.315	21.315	4.801	1279	1599	2025	2025	2132	2132	2238	2664	2878
11.750	80.5	10.250	0.672	12.750	....	23.387	23.387	4.801	1403	1754	2222	2222	2339	2339	2456	2923	3157
11.750	87.2	10.126	0.734	12.750	....	25.402	23.423	4.801	1405	1757	2225	2225	2342	2342	2459	2928	3162
11.875	71.8	10.625	0.582	12.750	....	20.648	20.648	6.001	1239	1549	1962	1962	2065	2065	2168	2581	2787
13.375	54.5	12.459	0.380	14.375	....	15.513	15.513	4.801	931	1163	1474	1474	1551	1551	1629	1939	2094
13.375	61.0	12.359	0.430	14.375	....	17.487	17.487	4.801	1049	1312	1661	1661	1749	1749	1836	2186	2361
13.375	68.0	12.259	0.480	14.375	....	19.445	19.445	4.801	1167	1458	1847	1847	1945	1945	2042	2431	2625
13.375	72.0	12.250	0.514	14.375	....	20.768	20.768	4.801	1246	1558	1973	1973	2077	2077	2181	2596	2804
13.375	77.0	12.119	0.550	14.375	....	22.160	22.160	4.801	1330	1662	2105	2105	2216	2216	2327	2770	2992
13.375	85.0	12.003	0.608	14.375	....	24.386	24.386	4.801	1463	1829	2317	2317	2439	2439	2561	3048	3292
13.625	88.2	12.250	0.625	14.375	....	25.525	25.525	7.201	1532	1914	2425	2425	2553	2553	2680	3191	3446



HUNTING INTERLOCK, INC. TKC 8 ROUND has high-temperature, elastomeric internal and external seals to block pressure from thread area, which allows threads to serve primarily as tensile joining members. Elastomeric seals can withstand repeated make and break cycles. It is manufactured to ¼ of API tolerances to ensure best possible match with API 8 round pins. With resistance to bending and torsional loads downhole, it is ideal for horizontal and deviated wells.

Hunting Interlock, Inc.—TKC 8 ROUND

Type: Coupled **Seal: Metal-to-metal, threaded**

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_p	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.396	0.253	5.563	5.375	3.773	2.670	3.435	138	182	201	241	254	254	266	317	342
5.000	15.0	4.283	0.296	5.563	5.375	4.374	3.271	3.435	169	223	246	295	311	311	326	388	420
5.000	18.0	4.151	0.362	5.563	5.375	5.275	4.171	3.435	215	284	314	376	396	396	416	495	535
5.000	21.4	4.126	0.437	5.563	5.375	6.264	5.161	3.435	266	352	389	466	490	490	515	613	662
5.000	23.2	4.044	0.478	5.563	5.375	6.791	5.687	3.435	293	388	428	513	540	540	567	675	729
5.000	24.1	4.000	0.500	5.563	5.375	7.069	5.965	3.435	307	407	449	538	567	567	595	708	765
5.500	15.5	4.825	0.275	6.050	5.875	4.514	3.299	3.560	164	217	239	298	306	313	329	392	423
5.500	17.0	4.767	0.304	6.050	5.875	4.962	3.747	3.560	186	247	272	338	348	356	374	445	481
5.500	20.0	4.653	0.361	6.050	5.875	5.828	4.613	3.560	229	304	334	416	428	438	460	548	592
5.500	23.0	4.545	0.415	6.050	5.875	6.630	5.414	3.560	269	356	392	489	502	514	540	643	694
6.625	20.0	5.924	0.288	7.390	7.000	5.734	4.267	3.935	200	266	290	369	375	405	426	500	547
6.625	24.0	5.796	0.352	7.390	7.000	6.937	5.470	3.935	256	340	372	473	481	520	546	641	702
6.625	28.0	5.666	0.417	7.390	7.000	8.133	6.666	3.935	312	415	454	576	586	633	665	781	855
6.625	32.0	5.550	0.475	7.390	7.000	9.177	7.710	3.935	361	480	525	666	678	732	769	904	989
7.000	23.0	6.241	0.317	7.656	7.375	6.656	5.105	4.060	235	313	341	435	442	479	505	590	655
7.000	26.0	6.151	0.362	7.656	7.375	7.549	5.998	4.060	276	367	401	511	519	563	593	693	769
7.000	29.0	6.059	0.408	7.656	7.375	8.449	6.899	4.060	318	423	461	587	597	648	683	797	885
7.000	32.0	5.969	0.453	7.656	7.375	9.317	7.766	4.060	358	476	519	661	672	729	768	897	996
7.000	35.0	5.879	0.498	7.656	7.375	10.172	8.622	4.060	397	528	576	734	746	809	853	996	1106
7.000	38.0	5.795	0.540	7.656	7.375	10.959	9.408	4.060	433	576	629	801	814	883	931	1087	1207
7.625	26.4	6.844	0.328	8.500	8.125	7.519	5.828	4.185	260	346	377	482	490	532	560	654	733
7.625	29.7	6.750	0.375	8.500	8.125	8.541	6.850	4.185	306	407	443	567	575	625	659	769	861
7.625	33.7	6.640	0.430	8.500	8.125	9.720	8.029	4.185	358	477	519	664	674	733	772	901	1009
7.625	39.0	6.500	0.500	8.500	8.125	11.192	9.501	4.185	424	564	614	786	798	867	914	1066	1194
7.625	42.8	6.376	0.562	8.500	8.125	12.470	10.779	4.185	481	640	696	891	906	984	1037	1210	1355
7.625	45.3	6.310	0.595	8.500	8.125	13.141	11.450	4.185	511	680	740	947	962	1045	1101	1285	1439
7.625	47.1	6.250	0.625	8.500	8.125	13.745	12.054	4.185	538	716	779	997	1013	1100	1159	1353	1515

Table continues

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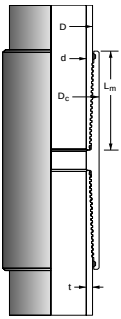
Hunting Interlock, Inc.—TKC 8 ROUND (continued)

									Minimum joint tension strength, kips								
8.625	32.0	7.796	0.352	9.625	9.125	9.149	7.234	4.560	313	417	452	583	591	643	678	791	887
8.625	36.0	7.700	0.400	9.625	9.125	10.336	8.421	4.560	364	486	526	678	688	749	789	921	1032
8.625	40.0	7.600	0.450	9.625	9.125	11.557	9.642	4.560	417	556	603	776	788	858	904	1055	1182
8.625	44.0	7.500	0.500	9.625	9.125	12.763	10.848	4.560	469	626	678	874	887	965	1017	1186	1330
8.625	49.0	7.386	0.557	9.625	9.125	14.118	12.203	4.560	528	704	763	983	997	1085	1144	1335	1496
9.625	36.0	8.765	0.352	10.625	10.125	10.254	8.116	4.810	339	453	489	634	643	700	738	861	966
9.625	40.0	8.679	0.395	10.625	10.125	11.454	9.315	4.810	389	520	561	727	737	804	847	988	1108
9.625	43.5	8.599	0.435	10.625	10.125	12.559	10.420	4.810	436	582	628	813	825	899	948	1105	1240
9.625	47.0	8.525	0.472	10.625	10.125	13.572	11.434	4.810	478	638	689	893	905	987	1040	1213	1361
9.625	53.5	8.379	0.545	10.625	10.125	15.547	13.408	4.810	560	748	808	1047	1062	1157	1220	1422	1595
9.625	58.4	8.279	0.595	10.625	10.125	16.879	14.741	4.810	616	823	888	1151	1167	1272	1341	1564	1754

Hunting Interlock, Inc.—TKC BUTTRESS

Type: Coupled **Seal: Metal-to-metal, threaded**

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sr}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.389	0.253	5.563	5.375	3.773	....	4.310	199	252	309	327	341	348	386	434	473
5.000	15.0	4.283	0.296	5.563	5.375	4.374	....	4.310	231	293	359	379	396	404	424	503	548
5.000	18.0	4.151	0.362	5.563	5.375	5.275	....	4.310	278	353	432	457	477	487	512	606	661
5.000	21.4	4.001	0.437	5.563	5.375	6.264	....	4.310	322	403	510	510	537	537	564	671	725
5.000	23.2	3.919	0.478	5.563	5.375	6.791	....	4.310	322	403	510	510	537	537	564	671	725
5.000	24.1	3.875	0.500	5.563	5.375	7.069	....	4.310	322	403	510	510	537	537	564	671	725
5.500	15.5	4.825	0.275	6.050	5.875	4.514	....	4.373	236	300	366	389	406	415	436	517	564
5.500	17.0	4.767	0.304	6.050	5.875	4.962	....	4.373	259	329	402	428	446	456	480	568	620
5.500	20.0	4.653	0.361	6.050	5.875	5.828	....	4.373	305	387	472	503	524	536	563	667	728
5.500	23.0	4.545	0.415	6.050	5.875	6.630	....	4.373	347	435	537	551	580	580	609	725	783
6.625	20.0	5.924	0.288	7.390	7.000	5.734	....	4.560	294	374	453	489	509	523	550	650	711
6.625	24.0	5.796	0.352	7.390	7.000	6.937	....	4.560	355	453	548	592	615	633	665	786	860
6.625	28.0	5.666	0.417	7.390	7.000	8.133	....	4.560	417	531	643	693	721	742	780	922	1008
6.625	32.0	5.550	0.475	7.390	7.000	9.177	....	4.560	470	599	725	783	814	837	880	1040	1138
7.000	23.0	6.241	0.317	7.656	7.375	6.656	....	4.748	339	432	522	565	588	605	636	752	823
7.000	26.0	6.151	0.362	7.656	7.375	7.549	....	4.748	384	490	592	641	667	687	722	853	934
7.000	29.0	6.059	0.408	7.656	7.375	8.449	....	4.748	430	548	662	718	746	768	808	955	1045
7.000	32.0	5.969	0.453	7.656	7.375	9.317	....	4.748	474	605	730	791	823	847	891	1053	1152
7.000	35.0	5.879	0.498	7.656	7.375	10.172	....	4.748	518	657	797	832	876	876	920	1095	1183
7.000	38.0	5.795	0.540	7.656	7.375	10.959	....	4.748	526	657	832	832	876	876	920	1095	1183
7.625	26.4	6.844	0.328	8.500	8.125	7.519	....	4.935	378	483	581	635	659	681	716	845	926
7.625	29.7	6.750	0.375	8.500	8.125	8.541	....	4.935	430	549	660	721	749	773	813	960	1052
7.625	33.7	6.640	0.430	8.500	8.125	9.720	....	4.935	489	625	751	820	852	880	925	1093	1197
7.625	39.0	6.500	0.500	8.500	8.125	11.192	....	4.935	563	720	864	945	981	1013	1065	1258	1379
7.625	42.8	6.376	0.562	8.500	8.125	12.470	....	4.935	627	802	963	1053	1093	1129	1187	1402	1536
7.625	45.3	6.310	0.595	8.500	8.125	13.141	....	4.935	661	845	1015	1109	1152	1189	1251	1477	1619
7.625	47.1	6.250	0.625	8.500	8.125	13.745	....	4.935	691	884	1062	1160	1205	1239	1301	1545	1673
8.625	32.0	7.796	0.352	9.625	9.125	9.149	....	5.060	451	579	690	764	792	822	864	1020	1120
8.625	36.0	7.700	0.400	9.625	9.125	10.336	....	5.060	510	654	780	864	895	928	976	1152	1265
8.625	40.0	7.600	0.450	9.625	9.125	11.557	....	5.060	570	732	872	966	1001	1038	1092	1288	1415
8.625	44.0	7.500	0.500	9.625	9.125	12.763	....	5.060	630	808	963	1066	1105	1146	1206	1423	1562
8.625	49.0	7.386	0.557	9.625	9.125	14.118	....	5.060	697	894	1065	1180	1222	1268	1334	1574	1728
9.625	36.0	8.765	0.352	10.625	10.125	10.254	....	5.060	496	639	755	848	877	914	982	1133	1247
9.625	40.0	8.679	0.395	10.625	10.125	11.454	....	5.060	554	714	843	947	979	1021	1074	1266	1393
9.625	43.5	8.599	0.435	10.625	10.125	12.559	....	5.060	608	783	925	1038	1074	1119	1178	1388	1527
9.625	47.0	8.525	0.472	10.625	10.125	13.572	....	5.060	657	846	999	1122	1161	1210	1273	1500	1650
9.625	53.5	8.379	0.545	10.625	10.125	15.547	....	5.060	753	969	1145	1285	1329	1386	1458	1718	1890
10.750	40.5	9.874	0.350	11.750	11.250	11.435	....	5.060	542	700	819	934	964	1010	1063	1251	1380
10.750	45.5	9.794	0.400	11.750	11.250	13.006	....	5.060	616	796	931	1063	1097	1149	1209	1423	1570
10.750	51.0	9.694	0.450	11.750	11.250	14.561	....	5.060	690	891	1043	1190	1228	1287	1354	1594	1758
10.750	55.5	9.604	0.495	11.750	11.250	15.947	....	5.060	755	976	1142	1303	1345	1409	1483	1745	1925
10.750	60.7	9.504	0.545	11.750	11.250	17.473	....	5.060	827	1070	1251	1428	1473	1544	1625	1912	2109
10.750	65.7	9.404	0.595	11.750	11.250	18.982	....	5.060	899	1162	1359	1551	1600	1677	1765	2077	2291
11.750	47.0	10.844	0.375	12.750	12.250	13.401	....	5.060	622	807	935	1084	1116	1175	1237	1454	1607
11.750	54.0	10.724	0.435	12.750	12.250	15.463	....	5.060	718	931	1079	1250	1287	1356	1427	1677	1854
11.750	60.0	10.616	0.489	12.750	12.250	17.300	....	5.060	803	1042	1208	1399	1440	1517	1596	1877	2074
13.375	54.5	12.459	0.380	14.375	14.188	15.514	....	5.060	696	909	1038	1233	1265	1343	1414	1659	1840
13.375	61.0	12.359	0.430	14.375	14.188	17.487	....	5.060	785	1025	1170	1389	1426	1514	1594	1870	2074
13.375	68.0	12.259	0.480	14.375	14.188	19.445	....	5.060	873	1140	1300	1545	1585	1683	1772	2079	2306
13.375	72.0	12.191	0.514	14.375	14.188	20.768	....	5.060	932	1217	1389	1650	1693	1797	1893	2221	2463



HUNTING INTERLOCK, INC. TKC BUTTRESS includes an integral ring that provides a smooth bore for turbulent-free flow, metal-to-metal seal when using pin end finish specifications and positive torque stop for mill and field end make-up. It incorporates high-temperature, elastomeric internal and external seals that block pressure from thread area, allowing threads to serve primarily as tensile joining members. Recommended for horizontal and deviated wells.

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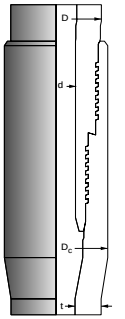

HYDRIL MAC-II is a hooked thread version of MAC. Equipped with combined tension, pressure and seal capability, It is recommended in high-pressure wells for heavy wall casing. Trouble-free make-up allows possible running rates of 20 joints per hour. Available in all MAC size and weight combinations.

Hydril—MAC - II

Type: Non-upset, integral swaged **Seal: Metal-to-metal (2)**

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	26.7	3.751	0.562	5.247	....	7.836	6.106	4.94	....	....	....	580	611	611	641	763	824
5.000	29.2	3.625	0.625	5.244	....	8.590	6.588	4.94	....	....	....	626	659	659	692	824	889
5.000	31.6	3.501	0.687	5.241	....	9.309	7.000	5.75	....	....	....	665	700	700	735	875	945
5.000	34.0	3.375	0.750	5.238	....	10.014	7.401	5.81	....	....	....	703	740	740	777	925	999
5.500	28.4	4.315	0.530	5.716	....	8.275	6.205	4.94	....	....	....	589	621	621	652	776	838
5.500	29.7	4.251	0.562	5.743	....	8.718	6.781	4.94	....	....	....	644	678	678	712	848	915
5.500	32.6	4.125	0.625	5.770	....	9.572	7.490	4.94	....	....	....	712	749	749	786	936	1011
5.500	35.3	4.001	0.687	5.767	....	10.388	7.951	5.75	....	....	....	755	795	795	835	994	1073
5.500	36.4	3.965	0.705	5.766	....	10.620	7.958	5.75	....	....	....	756	796	796	836	995	1074
5.500	38.0	3.875	0.750	5.764	....	11.192	8.418	5.81	....	....	....	800	842	842	884	1052	1136
5.500	40.5	3.751	0.812	5.761	....	11.959	8.851	6.44	....	....	....	841	885	885	929	1106	1195
6.625	36.7	5.376	0.562	6.921	....	10.705	8.250	5.00	....	....	....	784	825	825	866	1031	1114
6.625	40.2	5.250	0.625	6.887	....	11.781	9.020	5.75	....	....	....	857	902	902	947	1128	1218
6.625	43.7	5.126	0.687	6.951	....	12.816	9.860	5.75	....	....	....	937	986	986	1035	1233	1331
6.625	47.1	5.000	0.750	6.948	....	13.843	10.807	5.81	....	....	....	1027	1081	1081	1135	1351	1459
6.625	50.4	4.876	0.812	6.945	....	14.829	11.367	6.44	....	....	....	1080	1137	1137	1194	1421	1535
6.625	53.7	4.750	0.875	6.942	....	15.806	11.931	6.44	....	....	....	1133	1193	1193	1253	1491	1611
6.625	65.8	4.250	1.125	6.933	....	19.439	14.078	7.38	....	....	....	1337	1408	1408	1478	1760	1901
7.000	41.0	5.695	0.590	7.259	....	11.881	9.195	5.00	....	....	....	874	920	920	965	1149	1241
7.000	42.7	5.625	0.625	7.300	....	12.517	9.807	5.00	....	....	....	932	981	981	1030	1226	1324
7.000	44.0	5.595	0.640	7.270	....	12.788	9.679	5.75	....	....	....	920	968	968	1016	1210	1307
7.000	45.4	5.535	0.670	7.298	....	13.324	10.368	5.75	....	....	....	985	1037	1037	1089	1296	1400
7.000	46.4	5.501	0.687	7.311	....	13.625	10.664	5.75	....	....	....	1013	1066	1066	1120	1333	1440
7.000	49.5	5.415	0.730	7.344	....	14.379	11.349	5.81	....	....	....	1078	1135	1135	1192	1419	1532
7.000	50.1	5.375	0.750	7.343	....	14.726	11.349	5.81	....	....	....	1078	1135	1135	1192	1419	1532
7.000	53.6	5.251	0.812	7.340	....	15.785	12.235	6.44	....	....	....	1162	1224	1224	1285	1529	1652
7.000	57.1	5.125	0.875	7.337	....	16.837	12.838	6.44	....	....	....	1220	1284	1284	1348	1605	1733
7.000	60.5	5.001	0.937	7.334	....	17.847	13.423	7.38	....	....	....	1275	1342	1342	1409	1678	1812
7.000	63.9	4.875	1.000	7.331	....	18.850	14.063	7.38	....	....	....	1336	1406	1406	1477	1758	1899
7.625	45.3	6.375	0.595	7.885	....	13.141	9.710	5.00	....	....	....	922	971	971	1020	1214	1311
7.625	47.1	6.250	0.625	7.921	....	13.744	10.743	5.00	....	....	....	1021	1074	1074	1128	1343	1450
7.625	51.2	6.126	0.687	8.004	....	14.974	11.650	5.81	....	....	....	1107	1165	1165	1223	1456	1573
7.625	52.8	6.076	0.712	8.003	....	15.463	11.796	5.81	....	....	....	1121	1180	1180	1239	1475	1592
7.625	55.3	6.000	0.750	8.001	....	16.199	12.847	5.81	....	....	....	1220	1285	1285	1349	1606	1734
7.625	59.2	5.876	0.812	7.998	....	17.380	13.723	6.44	....	....	....	1304	1372	1372	1441	1715	1853
7.625	63.2	5.750	0.875	7.994	....	18.555	14.407	6.44	....	....	....	1369	1441	1441	1513	1801	1945
7.625	66.9	5.626	0.937	7.991	....	19.687	15.051	7.38	....	....	....	1430	1505	1505	1580	1881	2032
7.625	70.7	5.500	1.000	7.989	....	20.813	15.736	7.38	....	....	....	1495	1574	1574	1652	1967	2124
7.750	46.1	6.500	0.595	8.025	....	13.374	10.046	5.75	....	....	....	954	1005	1005	1055	1256	1356
7.750	48.6	6.375	0.640	8.084	....	14.296	10.934	5.75	....	....	....	1039	1093	1093	1148	1367	1476
8.000	70.8	6.001	0.937	8.386	....	20.791	15.804	7.38	....	....	....	1501	1580	1580	1659	1976	2134
8.063	74.2	6.000	0.980	8.450	....	21.807	16.570	7.38	....	....	....	1574	1657	1657	1740	2071	2237
8.625	54.0	7.250	0.625	8.884	....	15.708	11.869	5.81	....	....	....	1128	1187	1187	1246	1484	1602
8.625	58.7	7.126	0.687	8.970	....	17.132	13.249	5.81	....	....	....	1259	1325	1325	1391	1656	1789
8.625	63.5	7.000	0.750	9.054	....	18.555	14.439	5.81	....	....	....	1372	1444	1444	1516	1805	1949
8.625	68.1	6.876	0.812	9.051	....	19.931	15.784	6.50	....	....	....	1499	1578	1578	1657	1973	2131
8.625	72.7	6.750	0.875	9.047	....	21.304	16.905	7.38	....	....	....	1606	1691	1691	1775	2113	2282
8.625	77.1	6.626	0.937	9.044	....	22.631	17.766	7.38	....	....	....	1688	1777	1777	1865	2221	2398
8.625	81.5	6.500	1.000	9.041	....	23.955	18.562	7.38	....	....	....	1763	1856	1856	1949	2320	2506
8.625	83.2	6.500	1.025	9.075	....	24.473	18.767	7.38	....	....	....	1783	1877	1877	1971	2346	2534
9.625	58.4	8.375	0.595	9.843	....	16.879	11.793	5.81	....	....	....	1120	1179	1179	1238	1474	1592
9.625	59.4	8.251	0.609	9.873	....	17.250	13.033	5.81	....	....	....	1238	1303	1303	1368	1629	1759
9.625	61.1	8.219	0.625	9.889	....	17.671	13.440	5.81	....	....	....	1277	1344	1344	1411	1680	1814
9.625	64.9	8.125	0.672	9.965	....	18.901	14.620	5.81	....	....	....	1389	1462	1462	1535	1828	1974
9.625	70.3	8.001	0.734	10.047	....	20.502	16.017	6.50	....	....	....	1522	1602	1602	1682	2002	2162
9.625	71.6	7.969	0.750	10.060	....	20.911	16.410	6.50	....	....	....	1559	1641	1641	1723	2051	2215
9.625	75.6	7.875	0.797	10.099	....	22.104	17.558	6.50	....	....	....	1668	1756	1756	1844	2195	2370
9.625	80.8	7.751	0.859	10.102	....	23.656	18.779	7.38	....	....	....	1784	1878	1878	1972	2347	2535
9.625	86.0	7.625	0.922	10.098	....	25.209	20.213	7.38	....	....	....	1920	2021	2021	2122	2527	2729
9.625	91.0	7.501	0.984	10.095	....	26.712	21.093	7.44	....	....	....	2004	2109	2109	2215	2637	2848
9.875	62.8	8.500	0.625	10.147	....	18.162	13.655	5.81	....	....	....	1297	1366	1366	1434	1707	1843
10.750	73.2	9.250	0.672	11.041	....	21.276	16.264	5.81	....	....	....	1545	1626	1626	1708	2033	2196
10.750	75.9	9.194	0.700	11.076	....	22.101	17.066	5.81	....	....	....	1621	1707	1707	1792	2133	2304
10.750	79.2	9.126	0.734	11.131	....	23.096	18.021	5.81	....	....	....	1712	1802	1802	1892	2253	2433
10.750	80.8	9.125	0.750	11.157	....	23.562	18.366	5.81	....	....	....	1745	1837	1837	1928	2296	2479
10.750	85.3	9.000	0.797	11.139	....	24.921	19.474	7.44	....	....	....	1850	1947	1947	2045	2434	2629
10.750	91.2	8.876	0.859	11.223	....	26.692	21.184	7.44	....	....	....	2012	2118	2118	2224	2648	2860
10.750	97.1	8.750	0.922	11.283	....	28.467	22.257	7.44	....	....	....	2114	2226	2226	2337	2782	3005
10.750	102.9	8.626	0.984	11.280	....	30.190	24.257	7.50	....	....	....	2304	2426	2426	2547	3032	3275
10.750	104.3	8.594	1.000	11.232	....	30.631	23.140	7.44	....	....	....	2198	2314	2314	2430	2893	3124
10.750	108.7	8.500	1.047	11.276	....	31.916	25.602	7.44	....	....	....	2432	2560	2560	2688	3200	3456
11.750	87.5	10.126	0.734	12.097	....	25.402	19.647	6.56	....	....	....	1866	1965	1965	2063	2456	2652
11.750	94.0	10.000	0.797	12.185	....	27.425	21.580	6.56	....	....	....	2050	2158	2158	2266	2698	2913
11.750	100.5	9.876	0.859	12.267	....	29.391	23.313	7.44	....	....	....	2215	2331	2331	2448	2914	3147
11.750	107.1	9.750	0.922	12.320	....	31.364	25.209	7.44	....	....	....	2395	2521	2521	2647	3151	3403
11.750	113.5	9.626	0.984	12.332	....	33.281	26.713	7.44	....	....	....	2538	2671	2671	2805	3339	3606
11.750	119.9	9.500	1.047	12.330	....	35.205	28.590	7.44	....	....	....	2716	2859	2859	3002	3574	3860
12.750	94.2	11.126	0.734	13.091	....	27.708	21.370	6.56	....	....	....	2030	2137	2137	2244	2671	2885
12.750	101.7	11.000	0.797	13.185	....	29.929	23.510	6.56	....	....	....	2233	2351	2351	2469	2939	3174
12.750	109.1	10.876	0.859	13.285	....	32.089	25.584	6.56	....	....	....	2430	2558	2558	2686	3198	3454
12.750	116.5	10.750	0.922	13.311	....	34.260	27.153	7.50	....	....	....	2580	2715	2715	2851	3394	3666
12.750	123.7	10.626	0.984	13.387	....	36.373	29.182	7.50	....	....	....	2772	2918	2918	3064	3648	3940
12.750	130.9	10.500	1.047	13.384	....	38.494	29.689	7.50	....	....	....	2820	2969	2969	3117	3711	4008
12.750	137.9	10.376	1.109	13.379	....	40.558	33.085	7.44	....	....	....	3143	3309	3309	3474	4136	4466

Table continues

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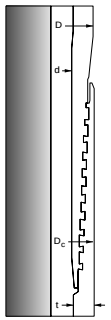
Hydril—MAC - II (continued)

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_s	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
13.375	92.5	11.875	0.672	13.680	....	26.818	20.267	6.56	....	....	....	1925	2027	2027	2128	2533	2736
13.375	100.3	11.751	0.734	13.759	....	29.149	22.510	6.56	....	....	....	2138	2251	2251	2364	2814	3039
13.375	108.1	11.625	0.797	13.756	....	31.493	24.425	7.44	....	....	....	2320	2443	2443	2565	3053	3297
13.375	115.7	11.501	0.859	13.848	....	33.776	26.622	7.44	....	....	....	2529	2662	2662	2795	3328	3594
13.375	123.4	11.375	0.922	13.936	....	36.071	28.522	7.50	....	....	....	2710	2852	2852	2995	3565	3850
13.375	130.8	11.251	0.984	13.991	....	38.305	30.668	7.50	....	....	....	2913	3067	3067	3220	3834	4140
13.375	138.3	11.125	1.047	14.033	....	40.550	32.662	7.50	....	....	....	3103	3266	3266	3430	4083	4409
13.375	145.6	11.001	1.109	14.037	....	42.735	33.936	7.50	....	....	....	3224	3394	3394	3563	4242	4581
14.000	99.6	12.444	0.700	14.306	....	29.248	22.109	6.56	....	....	....	2100	2211	2211	2321	2764	2985
14.000	104.2	12.376	0.734	14.354	....	30.590	23.397	6.56	....	....	....	2223	2340	2340	2457	2925	3159
14.000	112.6	12.250	0.797	14.458	....	33.058	25.750	6.56	....	....	....	2446	2575	2575	2704	3219	3476
16.000	109.0	14.500	0.656	16.706	....	31.622	20.891	7.56	....	....	....	1985	2089	2089	2194	2611	2820
16.000	118.0	14.382	0.715	16.706	....	34.334	25.312	7.56	....	....	....	2405	2531	2531	2658	3164	3417
16.000	128.6	14.250	0.781	16.706	....	37.341	28.192	7.56	....	....	....	2678	2819	2819	2960	3524	3806
16.000	137.9	14.126	0.843	16.706	....	40.141	30.876	7.56	....	....	....	2933	3088	3088	3242	3860	4168
16.000	147.3	14.000	0.906	16.706	....	42.962	33.579	7.56	....	....	....	3190	3358	3358	3526	4197	4533

Hydril—Series 500 Type 511

Type: Non-upset, integral flush **Seal: Threaded**

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_s	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	15.0	4.283	0.296	5.000	....	4.374	2.654	....	....	199	252	252	265	....	....	332	....
5.000	18.0	4.151	0.362	5.000	....	5.275	3.311	....	....	....	315	315	331	....	....	414	....
5.500	15.5	4.825	0.275	5.500	....	4.514	2.727	....	....	205	259	259	273	....	....	....	....
5.500	17.0	4.767	0.304	5.500	....	4.962	3.021	....	....	227	287	287	302	....	....	378	....
5.500	20.0	4.653	0.361	5.500	....	5.828	3.636	....	....	....	345	345	364	....	....	455	....
5.750	18.0	5.001	0.312	5.750	....	5.330	3.196	....	....	240	304	304	320	....	....	400	....
5.750	21.8	4.875	0.375	5.750	....	6.332	3.885	....	....	291	369	369	389	....	....	486	....
5.750	24.2	4.785	0.420	5.750	....	7.033	4.202	....	....	315	399	399	420	....	....	525	....
6.000	20.0	5.227	0.324	6.000	....	5.777	3.515	....	....	264	334	334	352	....	....	439	....
6.000	23.0	5.115	0.380	6.000	....	6.709	4.026	....	....	302	382	382	403	....	....	503	....
6.625	24.0	5.796	0.352	6.625	....	6.937	4.393	....	....	329	417	417	439	....	....	549	....
6.625	28.0	5.666	0.417	6.625	....	8.133	4.871	....	....	....	463	463	487	....	....	609	....
7.000	23.0	6.250	0.317	7.000	....	6.655	4.045	....	....	303	384	384	405	....	....	506	....
7.000	26.0	6.151	0.362	7.000	....	7.549	4.595	....	....	345	437	437	460	....	....	574	....
7.000	29.0	6.059	0.408	7.000	....	8.449	5.124	....	....	384	487	487	512	....	....	641	....
7.625	26.4	6.844	0.328	7.625	....	7.519	4.633	....	....	347	440	440	463	....	....	....	....
7.625	29.7	6.750	0.375	7.625	....	8.541	5.218	....	....	391	496	496	522	....	....	652	....
7.625	33.7	6.640	0.430	7.625	....	9.720	5.841	....	....	....	555	555	584	....	....	730	....
8.000	31.0	7.125	0.375	8.000	....	8.983	5.525	....	....	414	525	525	553	....	....	691	....
8.125	32.5	7.250	0.375	8.125	....	9.130	5.581	....	....	419	530	530	558	....	....	698	....
8.125	35.5	7.160	0.420	8.125	....	10.167	6.199	....	....	465	589	589	620	....	....	775	....
8.125	39.5	7.060	0.470	8.125	....	11.303	6.741	....	....	506	640	640	674	....	....	843	....
8.625	32.0	7.875	0.352	8.625	....	9.149	5.242	....	....	393	498	498	524	....	....	....	....
8.625	36.0	7.700	0.400	8.625	....	10.336	6.348	....	....	476	603	603	635	....	....	794	....
8.625	40.0	7.625	0.450	8.625	....	11.557	6.777	....	....	....	644	644	678	....	....	847	....
9.000	40.0	8.025	0.425	9.000	....	11.449	7.120	....	....	534	676	676	712	....	....	890	....
9.625	40.0	8.750	0.395	9.625	....	11.454	6.824	....	....	512	648	648	682	....	....	853	....
9.625	43.5	8.625	0.435	9.625	....	12.559	7.849	....	....	589	746	746	785	....	....	981	....
9.625	47.0	8.525	0.472	9.625	....	13.572	8.306	....	....	....	789	789	831	....	....	1038	....
10.750	45.5	9.875	0.400	10.750	....	13.006	7.671	....	....	575	729	729	767	....	....	959	....
10.750	51.0	9.694	0.450	10.750	....	14.561	9.159	....	....	687	870	870	916	....	....	1145	....
10.750	55.5	9.625	0.495	10.750	....	15.947	9.629	....	....	....	915	915	963	....	....	1204	....
10.750	60.7	9.504	0.545	10.750	....	17.473	11.258	....	....	....	1070	1070	1126	....	....	1407	....
10.750	65.7	9.500	0.595	10.750	....	18.982	11.318	....	....	....	1075	1075	1132	....	....	1415	....
11.750	60.0	10.625	0.489	11.750	....	17.300	10.499	....	....	....	997	997	1050	....	....	1312	....
11.750	65.0	10.625	0.534	11.750	....	18.816	10.499	....	....	....	997	997	1050	....	....	1312	....
11.875	71.8	10.625	0.582	11.875	....	20.648	12.658	....	....	....	1203	1203	1266	....	....	1582	....



HYDRIL Series 500 Type 511 is used in horizontal and extended reach wells, as drilling liners, and to salvage NUE tubing. Simultaneous tension and compression, created by bending, is eliminated by interlocking dovetail threads. Tension and bending strengths of 55–66% are provided, including thin-walled pipe.

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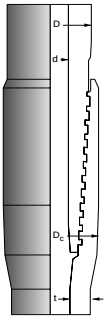
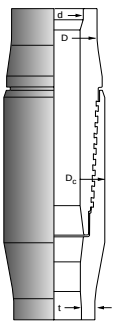


HYDRIL Series 500 Type 521 offers a combination of structural capabilities that include torque, bending, tension and compression strengths on streamline OD for clearance. Used in horizontal and extended reach wells, it eliminates cross threading and parting in thin wall pipe when used on large OD casing.

Hydril—Series 500 Type 521

Type: Non-upset, integral swaged **Seal:** Threaded

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.369	0.253	5.185	....	3.773	2.431	3.62	....	182	231	231	243	....	....	304	....
5.000	15.0	4.283	0.296	5.255	....	4.374	3.014	3.62	....	226	286	286	301	....	....	377	....
5.000	18.0	4.151	0.362	5.359	....	5.275	3.891	3.62	....	292	370	370	389	....	....	486	....
5.500	14.0	4.887	0.244	5.660	....	4.029	2.552	3.62	....	191	242	242	255	....	....	319	....
5.500	15.5	4.825	0.275	5.713	....	4.514	3.022	3.62	....	227	287	287	302	....	....	378	....
5.500	17.0	4.767	0.304	5.761	....	4.962	3.453	3.62	....	259	328	328	345	....	....	432	....
5.500	20.0	4.653	0.361	5.852	....	5.828	4.300	3.62	....	323	409	409	430	....	....	538	....
5.500	23.0	4.545	0.415	5.936	....	6.630	5.069	3.62	....	380	482	482	507	....	....	634	....
6.625	20.0	5.924	0.288	6.818	....	5.734	3.755	3.70	....	282	357	357	376	....	....	469	....
6.625	24.0	5.796	0.352	6.925	....	6.937	4.924	3.70	....	369	468	468	492	....	....	616	....
6.625	28.0	5.666	0.417	7.029	....	8.133	6.079	3.70	....	456	578	578	608	....	....	760	....
6.625	32.0	5.550	0.475	7.120	....	9.177	7.097	3.70	....	532	674	674	710	....	....	887	....
7.000	20.0	6.331	0.272	7.148	....	5.749	3.629	3.70	....	272	345	345	363	....	....	454	....
7.000	23.0	6.250	0.317	7.225	....	6.655	4.507	3.70	....	338	428	428	451	....	....	563	....
7.000	26.0	6.151	0.362	7.300	....	7.549	5.373	3.70	....	403	510	510	537	....	....	672	....
7.000	29.0	6.059	0.408	7.375	....	8.449	6.248	3.70	....	469	594	594	625	....	....	781	....
7.000	32.0	6.000	0.453	7.447	....	9.317	7.086	3.70	....	531	673	673	709	....	....	886	....
7.625	26.4	6.844	0.328	7.868	....	7.519	5.088	3.70	....	382	483	483	509	....	....	636	....
7.625	29.7	6.750	0.375	7.947	....	8.541	6.080	3.70	....	456	578	578	608	....	....	760	....
7.625	33.7	6.640	0.430	8.037	....	9.720	7.220	3.70	....	542	686	686	722	....	....	903	....
7.625	39.0	6.500	0.500	8.148	....	11.192	8.650	3.70	....	649	822	822	865	....	....	1081	....
8.625	32.0	7.875	0.352	8.889	....	9.149	6.234	3.70	....	468	592	592	623	....	....	779	....
8.625	36.0	7.700	0.400	8.970	....	10.336	7.384	3.70	....	554	701	701	738	....	....	923	....
8.625	40.0	7.625	0.450	9.053	....	11.557	8.572	3.70	....	643	814	814	857	....	....	1072	....
8.625	44.0	7.500	0.500	9.134	....	12.763	9.744	3.70	....	731	926	926	974	....	....	1218	....
9.625	36.0	8.765	0.352	9.883	....	10.254	6.841	3.70	....	513	650	650	684	....	....	855	....
9.625	40.0	8.750	0.395	9.957	....	11.454	8.012	3.70	....	601	761	761	801	....	....	1002	....
9.625	43.5	8.599	0.435	10.025	....	12.559	9.083	3.70	....	681	863	863	908	....	....	1135	....
9.625	47.0	8.525	0.472	10.087	....	13.572	10.052	3.70	....	754	955	955	1005	....	....	1257	....
9.625	53.5	8.500	0.545	10.206	....	15.546	11.976	3.70	....	898	1138	1138	1198	....	....	1497	....
10.750	40.5	9.894	0.350	10.863	....	11.435	7.206	4.14	....	542	687	687	723	....	....	904	....
10.750	45.5	9.875	0.400	10.950	....	13.006	8.651	4.14	....	649	822	822	865	....	....	1081	....
10.750	51.0	9.694	0.450	11.037	....	14.561	10.247	4.14	....	769	973	973	1025	....	....	1281	....
10.750	55.5	9.625	0.495	11.010	....	15.947	11.463	4.97	....	860	1089	1089	1146	....	....	1433	....
10.750	60.7	9.504	0.545	11.094	....	17.473	12.937	4.97	....	970	1229	1229	1294	....	....	1617	....
10.750	65.7	9.500	0.595	11.177	....	18.982	14.370	4.97	....	1078	1365	1365	1437	....	....	1796	....
11.750	47.0	10.844	0.375	11.892	....	13.401	8.577	4.14	....	643	815	815	858	....	....	1072	....
11.750	54.0	10.724	0.435	11.998	....	15.463	10.586	4.14	....	794	1006	1006	1059	....	....	1323	....
11.750	60.0	10.625	0.489	11.928	....	17.300	12.205	4.97	....	915	1159	1159	1221	....	....	1526	....
11.750	65.0	10.625	0.534	11.965	....	18.816	13.198	4.97	....	990	1254	1254	1320	....	....	1650	....
11.750	71.0	10.430	0.582	12.125	....	20.420	15.235	4.97	....	1143	1447	1447	1524	....	....	1904	....
11.750	73.6	10.376	0.609	12.170	....	21.315	16.103	4.97	....	1208	1530	1530	1610	....	....	2013	....
11.750	80.5	10.250	0.672	12.274	....	23.387	17.897	4.97	....	1357	1719	1719	1810	....	....	2262	....
11.875	71.8	10.625	0.582	12.269	....	20.648	15.353	4.97	....	1151	1459	1459	1535	....	....	1919	....
13.375	54.5	12.459	0.380	13.531	....	15.513	9.461	4.65	....	710	899	899	946	....	....	1183	....
13.375	61.0	12.359	0.430	13.620	....	17.487	11.362	4.65	....	852	1079	1079	1136	....	....	1420	....
13.375	68.0	12.259	0.480	13.707	....	19.445	13.254	4.65	....	994	1259	1259	1325	....	....	1657	....
13.375	72.0	12.250	0.514	13.766	....	20.768	14.537	4.65	....	1090	1381	1381	1454	....	....	1817	....
13.375	77.0	12.119	0.550	13.686	....	22.160	15.587	5.60	....	1169	1481	1481	1559	....	....	1948	....
13.375	80.7	12.059	0.580	13.738	....	23.314	16.693	5.60	....	1252	1586	1586	1669	....	....	2087	....
13.375	85.0	12.003	0.608	13.785	....	24.386	17.740	5.60	....	1331	1685	1685	1774	....	....	2218	....
13.375	86.0	12.000	0.625	13.814	....	25.035	18.361	5.60	....	1377	1744	1744	1836	....	....	2295	....
13.500	81.4	12.250	0.580	13.954	....	23.542	16.793	5.60	....	1259	1595	1595	1679	....	....	2099	....
13.625	88.2	12.250	0.625	14.040	....	25.525	18.708	5.60	....	1403	1777	1777	1871	....	....	2339	....
15.000	77.5	13.812	0.500	15.149	....	22.777	15.041	4.65	....	1128	1429	1429	1504	....	....	1880	....
16.000	84.0	14.822	0.495	16.257	....	24.112	16.644	4.65	....	1248	1581	1581	1664	....	....	2081	....
16.000	95.0	14.750	0.566	16.397	....	27.444	19.876	4.65	....	1491	1888	1888	1988	....	....	2485	....
16.000	96.0	14.750	0.575	16.397	....	27.864	20.296	4.65	....	1522	1928	1928	2030	....	....	2537	....
16.000	109.0	14.500	0.656	16.465	....	31.622	23.487	5.60	....	1762	2231	2231	2349	....	....	2936	....
16.000	118.0	14.382	0.715	16.566	....	34.334	26.116	5.60	....	1959	2481	2481	2612	....	....	3265	....
16.125	95.6	14.805	0.566	16.427	....	27.666	19.645	4.65	....	1473	1866	1866	1965	....	....	2456	....
18.000	105.0	16.688	0.562	18.100	....	30.788	19.869	4.65	....	1490	1888	1888	1987	....	....	2484	....
18.625	87.5	17.567	0.435	18.854	....	24.858	16.223	4.65	....	1217	1541	1541	1622	....	....	2028	....
18.625	94.5	17.517	0.460	18.899	....	26.251	17.580	4.65	....	1319	1670	1670	1758	....	....	2198	....
18.625	97.7	17.500	0.486	18.946	....	27.695	18.969	4.65	....	1423	1802	1802	1897	....	....	2371	....
18.625	109.4	17.311	0.563	18.948	....	31.947	22.588	5.60	....	1694	2146	2146	2259	....	....	2824	....
18.625	112.0	17.279	0.579	18.976	....	32.825	23.445	5.60	....	1758	2227	2227	2345	....	....	2931	....



HYDRIL Series 500 Type 533 is recommended for demanding workstring applications. An integral connection machined on internal/external upset ends, it provides pipe body strength combined with sealing reliability of a metal seal, is interchangeable with Type 563 and available with optional CB feature.

Hydril—Series 500 Type 533

Type: Upset, integral **Seal:** Metal-to-metal, threaded

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	15.0	4.283	0.296	5.430	....	4.374	....	3.99	....	241	241	350	350	394	416	481	547
5.000	18.0	4.151	0.362	5.535	....	5.275	....	3.99	....	....	....	422	422	475	501	580	659
5.500	15.5	4.825	0.275	5.899	....	4.514	....	3.99	....	248	248	....	....	....	....	....	564
5.500	17.0	4.767	0.304	5.948	....	4.962	....	3.99	....	273	273	397	397	447	471	546	620
5.500	20.0	4.653	0.361	6.040	....	5.828	....	3.99	....	....	....	466	466	525	554	641	729
5.500	23.0	4.545	0.415	6.124	....	6.630	....	3.99	....	....	....	530	530	597	630	729	829
5.500	26.0	4.423	0.478	6.218	....	7.513	....	4.30	....	....	....	601	601	676	714	826	939
5.500	26.8	4.375	0.500	6.119	....	7.854	....	4.30	....	....	....	628	628	707	746	864	982
5.500	28.4	4.315	0.530	6.163	....	8.275	....	4.30	....	....	....	662	662	745	786	910	1034
6.625	24.0	5.796	0.352	7.147	....	6.937	....	4.05	....	382	382	555	555	624	659	763	867
6.625	28.0	5.666	0.417	7.254	....	8.133	....	4.05	....	....	....	651	651	732	773	895	1017
6.625	32.0	5.550	0.475	7.345	....	9.177	....	4.05	....	....	....	734	734	826	872	1010	1147
7.000	23.0	6.250	0.317	7.476	....	6.655	....	4.05	....	366	366	532	532	599	632	....	832
7.000	26.0	6.151	0.362	7.552	....	7.549	....	4.05	....	415	415	604	604	679	717	830	944
7.000	29.0	6.059	0.408	7.628	....	8.449	....	4.05	....	....	....	676	676	760	803	929	1056
7.000	32.0	6.000	0.453	7.700	....	9.317	....	4.05	....	....	....	745	745	839	885	1025	1165
7.000	35.0	5.879	0.498	7.584	....	10.172	....	5.06	....	....	....	814	814	916	966	1119	1272
7.000	38.0	5.795	0.540	7.649	....	10.959	....	5.06	....	....	....	877	877	986	1041	1206	1370
7.625	26.4	6.844	0.326	8.123	....	7.519	....	4.05	....	411	411	598	598	673	710	822	934
7.625	29.7	6.750	0.375	8.203	....	8.541	....	4.05	....	....	....	683	683	769	811	940	1068
7.625	33.7	6.640	0.430	8.294	....	9.720	....	4.05	....	....	....	778	778	875	923	1069	1215
7.625	39.0	6.500	0.500	8.243	....	11.192	....	5.06	....	....	....	895	895	1007	1063	1231	1399

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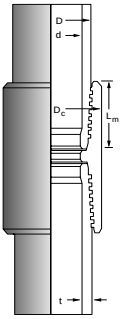
Hydril — Series 500 Type 563 Casing

Type: Non-upset, coupled Seal: Metal-to-metal, threaded

D	w	d	t	D_c	D_{cs}	A_t	A_c	L_{tm}	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.369	0.253	5.563	5.332	3.773	3.351	3.99	....	....	....	318	335	335	352	419	452
5.000	15.0	4.283	0.296	5.563	5.404	4.374	3.952	3.99	....	....	....	375	395	395	415	494	534
5.000	18.0	4.151	0.362	5.563	....	5.275	4.853	3.99	....	....	....	461	485	485	510	607	655
5.000	21.4	4.001	0.437	5.750	5.511	6.264	5.566	5.36	....	....	....	529	557	557	584	696	751
5.000	23.2	3.919	0.478	5.750	5.571	6.791	6.092	5.36	....	....	....	579	609	609	640	762	822
5.000	24.1	3.875	0.500	5.750	5.603	7.069	6.370	5.36	....	....	....	605	637	637	669	796	860
5.500	14.0	4.887	0.244	6.050	5.820	4.029	3.565	3.99	....	....	....	339	357	357	374	446	481
5.500	15.5	4.825	0.275	6.050	5.873	4.514	4.050	3.99	....	....	....	385	405	405	425	506	547
5.500	17.0	4.767	0.304	6.050	5.921	4.962	4.498	3.99	....	....	....	427	450	450	472	562	607
5.500	20.0	4.653	0.361	6.050	....	5.828	5.364	3.99	....	....	....	510	536	536	563	671	724
5.500	23.0	4.545	0.415	6.050	....	6.630	6.165	3.99	....	....	....	586	617	617	647	771	832
5.500	26.0	4.423	0.476	6.125	6.057	7.513	6.742	4.30	....	....	....	640	674	674	708	843	910
5.500	26.8	4.375	0.500	6.125	....	7.854	7.083	4.30	....	....	....	673	708	708	744	885	956
5.500	28.4	4.315	0.530	6.125	....	8.275	7.504	4.30	....	....	....	713	750	750	788	938	1013
5.500	29.7	4.251	0.562	6.250	6.085	8.718	7.871	5.06	....	....	....	748	787	787	826	984	1063
5.500	32.6	4.125	0.625	6.250	6.174	9.572	8.724	5.06	....	....	....	829	872	872	916	1091	1178
6.625	20.0	5.924	0.288	7.390	7.012	5.734	5.081	4.05	....	....	....	483	508	508	534	635	686
6.625	24.0	5.796	0.352	7.390	7.121	6.937	6.284	4.05	....	....	....	597	628	628	660	786	848
6.625	28.0	5.666	0.417	7.390	7.227	8.133	7.480	4.05	....	....	....	711	748	748	785	935	1010
6.625	32.0	5.550	0.475	7.390	....	9.177	8.525	4.05	....	....	....	810	853	853	895	1066	1151
7.000	20.0	6.331	0.272	7.656	7.371	5.749	5.060	4.05	....	....	....	481	506	506	531	633	683
7.000	23.0	6.250	0.317	7.656	7.449	6.655	5.966	4.05	....	....	....	567	597	597	626	746	805
7.000	26.0	6.151	0.362	7.656	7.525	7.549	6.860	4.05	....	....	....	652	686	686	720	858	926
7.000	29.0	6.059	0.408	7.656	....	8.449	7.760	4.05	....	....	....	737	776	776	815	970	1048
7.000	32.0	6.000	0.453	7.656	....	9.317	8.628	4.05	....	....	....	820	863	863	906	1079	1165
7.000	35.0	5.879	0.496	7.750	7.557	10.172	9.092	5.06	....	....	....	864	909	909	955	1137	1227
7.000	38.0	5.795	0.540	7.750	7.623	10.959	9.878	5.06	....	....	....	938	988	988	1037	1235	1334
7.000	41.0	5.695	0.590	7.750	....	11.881	10.800	5.06	....	....	....	1026	1080	1080	1134	1350	1458
7.000	42.7	5.625	0.625	7.750	....	12.517	11.436	5.06	....	....	....	1086	1144	1144	1201	1430	1544
7.625	26.4	6.844	0.328	8.500	8.097	7.519	6.768	4.05	....	....	....	643	677	677	711	846	914
7.625	29.7	6.750	0.375	8.500	8.177	8.541	7.790	4.05	....	....	....	740	779	779	818	974	1052
7.625	33.7	6.640	0.430	8.500	8.268	9.720	8.968	4.05	....	....	....	852	897	897	942	1121	1211
7.625	39.0	6.500	0.500	8.500	8.216	11.192	10.014	5.06	....	....	....	951	1001	1001	1051	1252	1352
7.625	42.8	6.376	0.562	8.500	8.315	12.470	11.292	5.06	....	....	....	1073	1129	1129	1186	1412	1524
7.625	45.3	6.310	0.595	8.500	8.366	13.141	11.963	5.06	....	....	....	1136	1196	1196	1256	1495	1615
7.750	46.1	6.500	0.595	8.500	8.413	13.374	12.093	5.19	....	....	....	1149	1209	1209	1270	1512	1633
7.750	48.6	6.375	0.640	8.500	....	14.296	13.014	5.19	....	....	....	1236	1301	1301	1366	1627	1757
8.625	32.0	7.875	0.352	9.625	9.143	9.149	8.298	4.05	....	....	....	788	830	830	871	1037	1120
8.625	36.0	7.700	0.400	9.625	9.225	10.336	9.485	4.05	....	....	....	901	949	949	996	1186	1280
8.625	40.0	7.625	0.450	9.625	9.309	11.557	10.707	4.05	....	....	....	1017	1071	1071	1124	1338	1445
8.625	44.0	7.500	0.500	9.625	9.226	12.763	11.429	5.06	....	....	....	1086	1143	1143	1200	1429	1543
8.625	49.0	7.386	0.557	9.625	9.319	14.118	12.784	5.06	....	....	....	1214	1278	1278	1342	1598	1726
8.625	52.0	7.310	0.595	9.625	9.379	15.010	13.676	5.06	....	....	....	1299	1368	1368	1436	1710	1846
8.625	54.0	7.250	0.625	9.625	9.427	15.708	14.374	5.06	....	....	....	1366	1437	1437	1509	1797	1940
9.625	36.0	8.765	0.352	10.625	10.147	10.254	9.305	4.05	....	....	....	884	931	931	977	1163	1256
9.625	40.0	8.750	0.395	10.625	10.222	11.454	10.504	4.05	....	....	....	998	1050	1050	1103	1313	1418
9.625	43.5	8.599	0.435	10.625	10.291	12.559	11.610	4.05	....	....	....	1103	1161	1161	1219	1451	1567
9.625	47.0	8.525	0.472	10.625	10.353	13.572	12.623	4.05	....	....	....	1199	1262	1262	1325	1578	1704
9.625	53.5	8.500	0.545	10.625	10.474	15.546	14.597	4.05	....	....	....	1387	1460	1460	1533	1825	1971
9.625	58.4	8.279	0.595	10.625	10.380	16.879	15.390	5.06	....	....	....	1462	1539	1539	1616	1924	2078
9.625	59.4	8.251	0.609	10.625	10.403	17.250	15.761	5.06	....	....	....	1497	1576	1576	1655	1970	2128
9.625	61.1	8.219	0.625	10.625	....	17.671	16.182	5.06	....	....	....	1537	1618	1618	1699	2023	2185
9.875	62.8	8.500	0.625	10.625	....	18.162	16.634	5.06	....	....	....	1580	1663	1663	1747	2079	2246
10.750	40.5	9.894	0.350	11.750	11.252	11.435	10.375	4.45	....	....	....	986	1038	1038	1089	1297	1401
10.750	45.5	9.875	0.400	11.750	11.340	13.006	11.945	4.45	....	....	....	1135	1195	1195	1254	1493	1613
10.750	51.0	9.694	0.450	11.750	11.427	14.561	13.501	4.45	....	....	....	1283	1350	1350	1418	1688	1823
10.750	55.5	9.625	0.495	11.750	11.334	15.947	14.434	5.22	....	....	....	1371	1443	1443	1516	1804	1949
10.750	60.7	9.504	0.545	11.750	11.420	17.473	15.959	5.22	....	....	....	1516	1596	1596	1676	1995	2154
10.750	65.7	9.500	0.595	11.750	11.503	18.982	17.469	5.22	....	....	....	1660	1747	1747	1834	2184	2358
10.750	73.2	9.250	0.672	11.750	11.630	21.276	19.763	5.22	....	....	....	1877	1976	1976	2075	2470	2668
10.750	79.2	9.126	0.734	11.750	....	23.096	21.432	6.06	....	....	....	2036	2143	2143	2250	2679	2893
11.750	47.0	10.844	0.375	12.750	12.299	13.401	12.241	4.45	....	....	....	1163	1224	1224	1285	1530	1653
11.750	54.0	10.724	0.435	12.750	12.406	15.463	14.303	4.45	....	....	....	1359	1430	1430	1502	1788	1931
11.750	60.0	10.625	0.489	12.750	12.363	17.300	15.645	5.22	....	....	....	1486	1565	1565	1643	1956	2112
11.750	65.0	10.625	0.534	12.750	12.441	18.816	17.161	5.22	....	....	....	1630	1716	1716	1802	2145	2317
11.750	71.0	10.430	0.582	12.750	12.523	20.420	18.765	5.22	....	....	....	1783	1877	1877	1970	2346	2533
11.750	75.0	10.358	0.618	12.750	12.584	21.613	19.958	5.22	....	....	....	1896	1996	1996	2096	2495	2694
11.750	79.0	10.282	0.656	12.750	....	22.863	21.209	5.22	....	....	....	2015	2121	2121	2227	2651	2863
11.875	71.8	10.625	0.582	12.750	....	20.648	18.976	5.22	....	....	....	1803	1898	1898	1992	2372	2562
13.375	54.5	12.459	0.380	14.375	13.923	15.513	14.005	5.17	....	....	....	1330	1401	1401	1471	1751	1891
13.375	61.0	12.359	0.430	14.375	14.013	17.487	15.979	5.17	....	....	....	1518	1598	1598	1678	1997	2157
13.375	68.0	12.259	0.480	14.375	14.102	19.445	17.937	5.17	....	....	....	1704	1794	1794	1883	2242	2421
13.375	72.0	12.250	0.514	14.375	14.162	20.768	19.259	5.17	....	....	....	1830	1926	1926	2022	2407	2600
13.375	77.0	12.119	0.550	14.375	14.090	22.160	20.088	6.06	....	....	....	1908	2009	2009	2109	2511	2712
13.375	80.7	12.059	0.580	14.375	14.142	23.314	21.242	6.06	....	....	....	2018	2124	2124	2230	2655	2868
13.375	85.0	12.003	0.608	14.375	14.190	24.386	22.314	6.06	....	....	....	2120	2231	2231	2343	2789	3012
13.375	86.0	11.969	0.625	14.375	14.219	25.035	22.962	6.06	....	....	....	2181	2296	2296	2411	2870	3100
13.500	81.4	12.250	0.580	14.375	....	23.542	20.735	5.17	....	....	....	1970	2074	2074	2177	2592	2799
13.625	88.2	12.250	0.625	14.625	14.470	25.525	23.414	6.06	....	....	....	2224	2341	2341	2458	2927	3161
14.000	92.7	12.544	0.650	15.000	14.830	27.261	25.092	6.06	....	....	....	2384	2509	2509	2635	3137	3387
14.000	99.4	12.444	0.700	15.000	....	29.248	27.079	6.06	....	....	....	2573	2708	2708	2843	3385	3656
14.000	106.1	12.344	0.750	15.000	....	31.220	29.050	6.06	....	....	....	2760	2905	2905	3050	3631	3922
14.000	112.8	12.244	0.800	15.000	....	33.175	31.006	6.06	....	....	....	2946	3101	3101	3256	3876	4186
16.000	75.0	14.936	0.438	17.000	16.656	21.414	19.608	5.17	....	....	....	1863	1961	1961	2059	2451	2647
16.000	84.0	14.822	0.495	17.000	16.758	24.112	22.306	5.17	....	....	....	2119	2231	2231	2342	2788	3011
16.000	109.0	14.500	0.656	17.000	....	31.622	29.142	6.06	....	....	....	2768	2914	2914	3060	3643	3934
16.000	118.0	14.382	0.715	17.000	....	34.334	31.853	6.06	....	....	....	3026	3185	3185	3345	3982	4300
18.625	109.4	17.311	0.563	20.000	19.370	31.947	29.058	6.06	....	....	....	2761	2906	2906	3051	3632	3923
18.625	112.0	17.279	0.579	20.000	19.399	32.825	29.937	6.06	....	....	....	2844	2994	2994	3143	3742	4041
18.625	136.0	17.051	0.693	20.000	19.602	39.040	36.152	6.06	....	....	....	3434	3615	3615	3796	4519	4881



HYDRIL Series 500 Type 563 casing is recommended for moderate to heavy-wall pipe for production tubing applications. Combining structureal characteristics of dovetail Wedge Thread with sealing reliability of a metal seal, has been selected for use on carbon steel in sour environments and on stainless steels. It is also available with optional CB feature.

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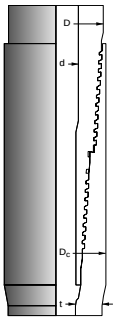
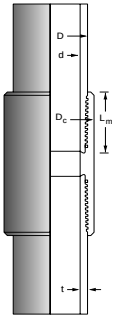


HYDRIL SuPreme LX offers a combination of tension strength, sealing performance and 0.5–1% larger than API maximum specified pipe body OD. Sliding metal-to-metal seal provides 100% collapse rating and functions as a secondary internal pressure seal. Additional thickness across the connection produces triaxial performance exceeding that of pipe body OD connections.

Hydril — SuPreme LX

Type: Non-upset, integral flush		Seal: Metal-to-metal							Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	15.0	4.283	0.296	5.092	....	4.374	3.147	4.49	....	....	299	299	315	315	330	393	425
5.000	18.0	4.151	0.362	5.105	....	5.275	3.697	4.49	....	....	351	351	370	370	388	462	499
5.000	20.3	4.059	0.408	5.114	....	5.886	4.599	4.92	....	....	437	437	460	460	483	575	621
5.000	20.8	4.031	0.422	5.117	....	6.069	4.775	4.92	....	....	454	454	478	478	501	597	645
5.000	21.4	4.001	0.437	5.119	....	6.264	4.963	4.92	....	....	471	471	496	496	521	620	670
5.000	23.2	3.919	0.478	5.128	....	6.791	5.364	5.29	....	....	510	510	536	536	563	671	724
5.000	24.1	3.875	0.500	5.132	....	7.069	5.632	5.29	....	....	535	535	563	563	591	704	760
5.500	17.0	4.767	0.304	5.598	....	4.962	3.568	4.40	....	....	339	339	357	357	375	446	482
5.500	20.0	4.653	0.361	5.608	....	5.828	4.196	4.40	....	....	393	393	414	414	434	517	558
5.500	23.0	4.545	0.415	5.619	....	6.630	5.151	5.02	....	....	489	489	515	515	541	644	695
5.500	26.0	4.423	0.476	5.631	....	7.513	5.733	5.17	....	....	545	545	573	573	602	717	774
5.500	26.8	4.375	0.500	5.635	....	7.854	6.181	5.17	....	....	587	587	618	618	649	773	834
6.625	22.6	5.840	0.330	6.736	....	6.526	4.149	4.41	....	....	394	394	415	415	436	519	560
6.625	24.0	5.796	0.352	6.740	....	6.937	4.622	4.41	....	....	439	439	462	462	485	578	624
6.625	24.6	5.776	0.362	6.742	....	7.123	4.803	4.41	....	....	456	456	480	480	504	600	648
6.625	28.0	5.666	0.417	6.752	....	8.133	6.333	5.18	....	....	602	602	633	633	665	792	855
6.625	32.0	5.550	0.475	6.763	....	9.177	7.280	5.18	....	....	692	692	728	728	764	910	983
6.625	33.0	5.500	0.500	6.768	....	9.621	7.686	5.47	....	....	730	730	769	769	807	961	1038
6.625	34.5	5.450	0.525	6.773	....	10.061	8.109	5.47	....	....	770	770	811	811	851	1014	1095
7.000	23.0	6.241	0.317	7.111	....	6.655	4.879	4.41	....	....	464	464	488	488	512	610	659
7.000	26.0	6.151	0.362	7.120	....	7.549	5.603	4.41	....	....	532	532	560	560	588	700	756
7.000	29.0	6.059	0.408	7.128	....	8.449	6.463	4.93	....	....	614	614	646	646	679	808	873
7.000	32.0	6.000	0.453	7.153	....	9.317	7.409	4.93	....	....	704	704	741	741	778	926	1000
7.000	35.0	5.879	0.498	7.145	....	10.172	8.205	5.80	....	....	779	779	821	821	862	1026	1108
7.000	38.0	5.795	0.540	7.169	....	10.959	8.961	5.80	....	....	851	851	896	896	941	1120	1210
7.000	41.0	5.695	0.590	7.163	....	11.881	9.770	5.97	....	....	928	928	977	977	1026	1221	1319
7.000	42.7	5.625	0.625	7.200	....	12.517	10.279	5.97	....	....	977	977	1028	1028	1079	1285	1388
7.625	26.4	6.844	0.328	7.743	....	7.519	5.570	4.72	....	....	529	529	557	557	585	696	752
7.625	29.7	6.750	0.375	7.752	....	8.541	6.358	4.72	....	....	604	604	636	636	668	795	858
7.625	33.7	6.640	0.430	7.762	....	9.720	7.624	5.49	....	....	724	724	762	762	801	953	1029
7.625	39.0	6.500	0.500	7.775	....	11.192	8.861	5.49	....	....	842	842	886	886	930	1108	1196
7.625	42.8	6.376	0.562	7.787	....	12.470	10.174	5.97	....	....	967	967	1017	1017	1068	1272	1373
7.625	45.3	6.310	0.595	7.793	....	13.141	10.819	5.97	....	....	1028	1028	1082	1082	1136	1352	1461
7.625	47.1	6.250	0.625	7.799	....	13.744	11.310	6.16	....	....	1074	1074	1131	1131	1188	1414	1527
7.750	46.1	6.500	0.595	7.937	....	13.374	10.917	6.16	....	....	1037	1037	1092	1092	1146	1365	1474
7.750	48.6	6.375	0.640	7.945	....	14.296	11.421	6.16	....	....	1085	1085	1142	1142	1199	1428	1542
7.750	54.2	6.250	0.712	7.995	....	15.743	11.805	6.16	....	....	1121	1121	1181	1181	1240	1476	1594
8.625	36.0	7.700	0.400	8.764	....	10.336	7.575	5.19	....	....	720	720	758	758	795	947	1023
8.625	40.0	7.600	0.450	8.773	....	11.557	8.745	5.19	....	....	831	831	875	875	918	1093	1181
8.625	44.0	7.500	0.500	8.782	....	12.763	9.803	5.80	....	....	931	931	980	980	1029	1225	1323
8.625	49.0	7.386	0.557	8.793	....	14.118	11.204	5.80	....	....	1064	1064	1120	1120	1176	1401	1513
8.625	52.0	7.310	0.595	8.801	....	15.010	11.752	6.17	....	....	1126	1126	1185	1185	1244	1482	1600
8.625	54.0	7.250	0.625	8.806	....	15.708	12.523	6.17	....	....	1190	1190	1252	1252	1315	1565	1691
9.625	43.5	8.625	0.435	9.778	....	12.559	9.310	5.32	....	....	884	884	931	931	978	1164	1257
9.625	47.0	8.525	0.472	9.784	....	13.572	10.281	5.32	....	....	977	977	1028	1028	1080	1285	1388
9.625	53.5	8.500	0.545	9.821	....	15.546	12.062	5.45	....	....	1146	1146	1206	1206	1267	1508	1628
9.625	58.4	8.375	0.595	9.830	....	16.879	12.974	5.45	....	....	1233	1233	1297	1297	1362	1622	1751
9.750	59.2	8.500	0.595	9.956	....	17.113	12.953	6.22	....	....	1231	1231	1295	1295	1360	1619	1749
9.875	62.8	8.500	0.625	10.065	....	18.162	14.358	6.22	....	....	1364	1364	1436	1436	1508	1795	1938
10.000	67.0	8.500	0.672	10.100	....	19.693	15.091	6.22	....	....	1434	1434	1509	1509	1585	1886	2037
10.000	68.4	8.500	0.688	10.150	....	20.127	15.091	6.22	....	....	1434	1434	1509	1509	1585	1886	2037
10.750	51.0	9.694	0.450	10.914	....	14.561	10.765	5.46	....	....	1023	1023	1077	1077	1130	1346	1453
10.750	55.5	9.604	0.495	10.922	....	15.947	12.092	5.46	....	....	1149	1149	1209	1209	1270	1512	1632
10.750	60.7	9.504	0.545	10.931	....	17.473	13.397	5.83	....	....	1273	1273	1340	1340	1407	1675	1809
10.750	65.7	9.500	0.595	10.966	....	18.844	14.844	5.83	....	....	1410	1410	1484	1484	1559	1856	2004
11.750	60.0	10.625	0.489	11.928	....	17.300	12.548	5.63	....	....	1192	1192	1255	1255	1318	1569	1694
11.750	65.0	10.625	0.534	11.965	....	18.816	14.000	5.63	....	....	1330	1330	1400	1400	1470	1750	1890
11.750	71.0	10.430	0.582	11.975	....	20.420	15.656	5.63	....	....	1487	1487	1566	1566	1644	1957	2114
11.875	71.8	10.625	0.582	12.072	....	20.648	15.710	5.83	....	....	1492	1492	1571	1571	1650	1964	2121
12.000	74.8	10.625	0.615	12.204	....	21.997	17.165	5.83	....	....	1631	1631	1717	1717	1802	2146	2317
12.063	78.1	10.625	0.640	12.272	....	22.967	17.365	5.83	....	....	1650	1650	1737	1737	1823	2171	2344
13.375	68.0	12.259	0.480	13.564	....	19.445	14.024	5.64	....	....	1332	1332	1402	1402	1473	1753	1893
13.375	72.0	12.250	0.514	13.602	....	20.768	15.289	5.64	....	....	1452	1452	1529	1529	1605	1911	2064
13.375	77.0	12.119	0.550	13.609	....	22.160	16.774	5.64	....	....	1594	1594	1677	1677	1761	2097	2264
13.375	80.7	12.059	0.580	13.614	....	23.314	17.687	6.30	....	....	1680	1680	1769	1769	1857	2211	2388
13.375	85.0	12.003	0.608	13.619	....	24.386	18.698	6.30	....	....	1776	1776	1870	1870	1963	2337	2524
13.375	86.0	11.969	0.625	13.622	....	25.035	19.333	6.30	....	....	1837	1837	1933	1933	2030	2417	2610
13.500	81.4	12.250	0.580	13.740	....	23.542	18.039	5.64	....	....	1714	1714	1804	1804	1894	2255	2435
13.625	88.2	12.250	0.625	13.875	....	25.525	19.506	6.30	....	....	1853	1853	1951	1951	2048	2438	2633



KAWASAKI STEEL/HUNTING OILFIELD SERVICES Fox is a premium coupled plain end tubing and casing connection providing full pipe-rated strength in tension, burst, collapse and bending. Advanced contoured seal and shoulder design provide superior sealing performance, high resistance to over-torque and resists back-off from thermal shock and impact by storing a high level of energy in mating parts during make-up. A unique change in thread pitch reduces high stress concentrations and provides more even load distribution among threads.

Kawasaki Steel/Hunting Oilfield Services—Fox

Type: Coupled		Seal: Metal-to-metal							Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.369	0.253	5.563	5.375	....	3.773	4.64	151	208	208	302	302	340	358	415	472
5.000	15.0	4.283	0.296	5.563	5.375	....	4.374	4.64	175	241	241	350	350	394	416	481	547
5.000	18.0	4.151	0.362	5.563	5.375	....	5.275	4.64	211	290	290	422	422	475	501	580	659
5.000	20.3	4.059	0.408	5.563	5.375	....	5.482	4.64	219	302	302	439	439	494	521	604	686
5.000	20.8	4.031	0.422	5.563	5.375	....	5.487	4.64	219	302	302	439	439	494	521	604	686
5.000	21.4	4.001	0.437	5.563	5.375	....	5.487	4.64	219	302	302	439	439	494	521	604	686
5.000	23.2	3.919	0.478	5.563	5.375	....	5.487	4.64	219	302	302	439	439	494	521	604	686
5.000	24.1	3.875	0.500	5.563	5.375	....	5.487	4.64	219	302	302	439	439	494	521	604	686
5.500	15.5	4.825	0.275	6.050	5.875	....	4.514	4.64	181	248	248	361	361	406	429	497	564
5.500	17.0	4.767	0.304	6.050	5.875	....	4.962	4.64	198	273	273	397	397	447	471	546	620
5.500	20.0	4.653	0.361	6.050	5.875	....	5.828	4.64	233	321	321	466	466	525	554	641	729
5.500	23.0	4.545	0.415	6.050	5.875	....	5.888	4.64	236	324	324	471	471	530	559	648	736
5.500	26.0	4.423	0.476	6.050	5.875	....	5.888	4.64	236	324	324	471	471	530	559	648	736
5.500	26.8	4.375	0.500	6.050	5.875	....	5.888	4.64	236	324	324	471	471	530	559	648	736
6.625	20.0	5.924	0.288	7.390	7.000	....	5.734	4.84	229	315	315	459	459	516	545	631	717
6.625	23.2	5.840	0.330	7.390	7.000	....	6.526	4.84	261	359	359	522	522	587	620	718	816
6.625	24.0	5.796	0.352	7.390	7.000	....	6.937	4.84	277	382	382	555	555	624	659	763	867
6.625	28.0	5.666	0.417	7.390	7.000	....	8.133	4.84	325	447	447	651	651	732	773	895	1017
6.625	32.0	5.550	0.475	7.390	7.000	....	9.177	4.84	367	505	505	734	734	826	872	1010	1147
6.625	35.0	5.450	0.525	7.390	7.000	....	9.627	4.84	385	530	530	770	770	866	915	1059	1203
7.000	20.0	6.331	0.272	7.656	7.375	....	5.749	5.04	230	316	316	460	460	517	546	632	719
7.000	23.0	6.241	0.317	7.656	7.375	....	6.655	5.04	266	366	366	532	532	599	632	732	832
7.000	26.0	6.151	0.362	7.656	7.375	....	7.549	5.04	302	415	415	604	604	679	717	830	944
7.000	29.0	6.059	0.408	7.656	7.375	....	8.449	5.04	338	465	465	676	676	760	803	929	1056

Table continues

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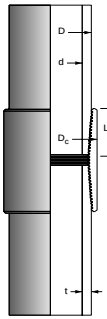

MANNESMANN Big Omega is a threaded and coupled connection for large OD surface and intermediate casing and conductor pipe. Three threads per inch and steep 1:7.5 thread taper produce quick running times while virtually eliminating cross threading. Problems associated with welding on connectors are eliminated because coupling is threaded directly onto pipe.

Kawasaki Steel/Hunting Oilfield Services—Fox (continued)

								Minimum joint tension strength, kips										
7.000	32.0	5.969	0.453	7.656	7.375	....	....	8.967	5.04	359	493	493	717	717	807	852	986	1121
7.000	35.0	5.879	0.498	7.656	7.375	....	....	8.967	5.04	359	493	493	717	717	807	852	986	1121
7.000	38.0	5.795	0.540	7.656	7.375	....	....	8.967	5.04	359	493	493	717	717	807	852	986	1121
7.000	41.0	5.695	0.590	7.656	7.375	....	....	8.967	5.04	359	493	493	717	717	807	852	986	1121
7.000	44.0	5.595	0.640	7.656	7.375	....	....	8.967	5.04	359	493	493	717	717	807	852	986	1121
7.000	46.0	5.535	0.670	7.656	7.375	....	....	8.967	5.04	359	493	493	717	717	807	852	986	1121
7.000	49.5	5.415	0.730	7.656	7.375	....	....	8.967	5.04	359	493	493	717	717	807	852	986	1121
7.625	26.4	6.844	0.328	8.500	8.125	....	....	7.519	5.24	301	414	414	602	602	677	714	827	940
7.625	29.7	6.750	0.375	8.500	8.125	....	....	8.541	5.24	342	470	470	683	683	769	811	940	1068
7.625	33.7	6.640	0.430	8.500	8.125	....	....	9.720	5.24	389	535	535	778	778	875	923	1069	1215
7.625	35.8	6.570	0.465	8.500	8.125	....	....	10.460	5.24	418	575	575	837	837	941	994	1151	1307
7.625	39.0	6.500	0.500	8.500	8.125	....	....	11.192	5.24	448	616	616	895	895	1007	1063	1231	1399
7.625	42.8	6.376	0.562	8.500	8.125	....	....	12.470	5.24	499	686	686	998	998	1122	1185	1372	1559
7.625	45.3	6.310	0.595	8.500	8.125	....	....	12.766	5.24	511	702	702	1021	1021	1149	1213	1404	1596
7.625	51.2	6.126	0.687	8.500	8.125	....	....	12.766	5.24	511	702	702	1021	1021	1149	1213	1404	1596
8.625	32.0	7.796	0.352	9.625	9.125	....	....	9.149	5.24	366	503	503	732	732	823	869	1006	1144
8.625	36.0	7.700	0.400	9.625	9.125	....	....	10.336	5.24	413	568	568	827	827	930	982	1137	1292
8.625	40.0	7.600	0.450	9.625	9.125	....	....	11.557	5.24	462	636	636	925	925	1040	1098	1271	1445
8.625	44.0	7.500	0.500	9.625	9.125	....	....	12.763	5.24	511	702	702	1021	1,021	1149	1212	1404	1595
8.625	49.0	7.386	0.557	9.625	9.125	....	....	14.118	5.24	565	776	776	1129	1,129	1271	1341	1553	1765
8.625	52.0	7.310	0.595	9.625	9.125	....	....	15.010	5.24	600	826	826	1201	1201	1351	1426	1651	1876
9.625	36.0	8.765	0.352	10.625	10.125	....	....	10.254	5.24	410	564	564	820	820	923	974	1128	1282
9.625	40.0	8.679	0.395	10.625	10.125	....	....	11.454	5.24	458	630	630	916	916	1031	1088	1260	1432
9.625	43.5	8.599	0.435	10.625	10.125	....	....	12.559	5.24	502	691	691	1005	1005	1130	1193	1381	1570
9.625	47.0	8.525	0.472	10.625	10.125	....	....	13.572	5.24	543	746	746	1086	1086	1222	1289	1493	1697
9.625	53.5	8.379	0.545	10.625	10.125	....	....	15.546	5.24	622	855	855	1244	1244	1399	1477	1710	1943
9.625	58.4	8.279	0.595	10.625	10.125	....	....	16.879	5.24	675	928	928	1350	1350	1519	1604	1857	2110
9.625	59.4	8.251	0.609	10.625	10.125	....	....	17.250	5.24	690	949	949	1380	1380	1552	1639	1897	2156
9.625	61.1	8.219	0.625	10.625	10.125	....	....	17.671	5.24	707	972	972	1414	1414	1590	1679	1944	2209
10.750	40.5	9.894	0.350	11.750	11.250	....	....	11.435	5.24	457	629	629	915	915	1029	1086	1258	1429
10.750	45.5	9.794	0.400	11.750	11.250	....	....	13.006	5.24	520	715	715	1040	1040	1171	1236	1431	1626
10.750	51.0	9.694	0.450	11.750	11.250	....	....	14.561	5.24	582	801	801	1165	1165	1311	1383	1602	1820
10.750	55.5	9.604	0.495	11.750	11.250	....	....	15.947	5.24	638	877	877	1276	1276	1435	1515	1754	1993
10.750	60.7	9.504	0.545	11.750	11.250	....	....	17.473	5.24	699	961	961	1398	1398	1573	1660	1922	2184
10.750	65.7	9.404	0.595	11.750	11.250	....	....	18.982	5.24	759	1044	1044	1519	1519	1708	1803	2088	2373
10.750	73.2	9.250	0.672	11.750	11.250	....	....	20.053	5.24	802	1103	1103	1604	1604	1805	1905	2206	2507
11.750	47.0	10.844	0.375	12.750	....	....	....	13.401	5.24	536	737	737	1072	1072	1206	1273	1474	1675
11.750	54.0	10.724	0.435	12.750	....	....	....	15.463	5.24	619	850	850	1237	1237	1392	1469	1701	1933
11.750	60.0	10.616	0.489	12.750	....	....	....	17.300	5.24	692	951	951	1384	1384	1557	1643	1903	2162
11.750	65.0	10.526	0.534	12.750	....	....	....	18.816	5.24	753	1035	1035	1505	1505	1693	1788	2070	2352
13.375	54.5	12.459	0.380	14.375	....	....	....	15.513	5.24	621	853	853	1241	1241	1396	1474	1706	1939
13.375	61.0	12.359	0.430	14.375	....	....	....	17.487	5.24	699	962	962	1399	1399	1574	1661	1924	2186
13.375	68.0	12.259	0.480	14.375	....	....	....	19.445	5.24	778	1069	1069	1556	1556	1750	1847	2139	2431
13.375	72.0	12.191	0.514	14.375	....	....	....	20.768	5.24	831	1142	1142	1661	1661	1869	1973	2284	2596
13.375	77.0	12.119	0.550	14.375	....	....	....	22.160	5.24	886	1219	1219	1773	1773	1994	2105	2438	2770
13.375	80.7	12.059	0.580	14.375	....	....	....	23.314	5.24	933	1282	1282	1865	1865	2098	2215	2565	2914
13.375	85.0	12.003	0.608	14.375	....	....	....	24.386	5.24	975	1341	1341	1951	1951	2195	2317	2682	3048
13.375	86.0	11.969	0.625	14.375	....	....	....	24.762	5.24	990	1362	1362	1981	1981	2229	2352	2724	3095

Mannesmann—Big Omega

Type: Coupled Seal: Threaded

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_s	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125	MW-100SS	MW-110SS
13.625	88.2	12.250	0.625	14.625	14.375	25.525	25.525	4.815	....	....	....	2023	2074	2205	2322	2723	3022	2438	2672
14.000	82.5	12.663	0.562	15.000	....	23.726	23.726	4.815	....	1376	1560	1872	1918	2043	2152	2523	2802	....	....
14.000	94.8	12.465	0.656	15.000	....	27.500	27.500	4.815	....	1595	1808	2170	2224	2368	2494	2924	3248	....	....
14.000	99.3	12.395	0.688	15.000	....	28.773	28.773	4.815	....	1669	1892	2271	2326	2478	2609	3060	3398	....	....
14.000	103.5	12.337	0.720	15.000	....	30.039	30.039	4.815	....	1742	1975	2371	2429	2587	2724	3194	3548	....	....
14.000	110.0	12.250	0.772	15.000	....	32.082	32.082	4.815	....	1861	2109	2532	2594	2763	2910	3411	3789	....	....
14.000	120.0	12.077	0.850	15.000	....	35.115	33.321	4.815	....	2037	2309	2771	2839	3024	3185	3734	4147	....	....
14.000	127.0	12.001	0.906	15.000	....	37.269	33.321	4.815	....	2162	2451	2941	3013	3766	3324	3957	4273	....	....
16.000	75.0	14.936	0.438	17.000	....	21.414	21.414	3.815	....	1200	1331	....	....	....	....	....	....	....	....
16.000	84.0	14.822	0.495	17.000	....	24.112	24.112	4.815	....	1351	1498	1861	1898	2043	....	....	....	....	....
16.000	94.5	14.750	0.562	17.000	....	27.257	27.257	4.815	....	1527	1694	2104	2146	2310	2434	2846	3176	....	....
16.000	109.0	14.500	0.656	17.000	....	31.622	31.622	4.815	....	1772	1965	2441	2489	2680	2823	3302	3684	....	....
16.000	118.0	14.341	0.715	17.000	....	34.334	34.334	4.815	....	1924	2134	2650	2703	2910	3065	3585	3065	....	....
16.000	128.0	14.229	0.781	17.000	....	37.341	37.341	4.815	....	2092	2321	2883	2940	3164	3334	3900	4351	....	....
16.000	138.0	14.075	0.850	17.000	....	40.456	38.093	4.815	....	2267	2514	3123	3185	3428	3612	4225	4714	....	....
16.000	147.0	14.000	0.906	17.000	....	42.962	38.093	4.815	....	2407	2670	3316	3382	3637	3834	4486	4954	....	....
18.625	87.5	17.567	0.435	20.000	19.625	24.858	24.858	3.815	....	1329	1428	....	....	....	....	....	....	....	....
18.625	96.5	17.500	0.485	20.000	19.625	27.639	27.639	3.185	....	1480	1587	2071	2099	....	....	....	....	....	....
18.625	114.0	17.233	0.579	20.000	19.625	32.825	32.825	4.815	....	1754	1885	2460	2493	....	2871	3346	3756	....	....
18.625	136.0	17.003	0.693	20.000	....	39.040	39.040	4.815	....	2087	2241	2925	2964	....	3413	3979	4467	....	....
18.625	139.0	17.000	0.720	20.000	....	40.500	40.500	4.815	....	2165	2326	3035	3076	....	3542	4128	4634	....	....
18.788	111.0	17.500	0.550	20.000	....	31.513	31.513	3.815	....	1679	1800	2357	2387	....	2752	3207	3602	....	....
20.000	94.0	18.937	0.438	21.000	....	26.918	26.918	3.815	....	1406	1480	....	....	....	....	....	....	....	....
20.000	106.5	18.813	0.500	21.000	....	30.631	30.631	3.815	....	1596	1683	2259	2281	....	....	....	....	....	....
20.000	118.5	18.687	0.563	21.000	....	34.379	34.379	4.815	....	1791	1889	2535	2560	....	2973	3459	3896	....	....
20.000	133.0	18.543	0.635	21.000	....	38.631	38.631	4.815	....	2012	2123	2849	2877	....	3341	3887	4378	....	....
20.000	147.0	14.348	0.709	21.000	....	42.969	42.969	4.815	....	2238	2361	3169	3200	....	3716	4323	4869	....	....
20.000	169.0	18.138	0.812	21.000	....	48.948	48.948	4.815	....	2550	2689	3609	3644	....	4231	4923	5547	....	....
24.000	162.0	22.433	0.635	25.000	....	46.611	46.611	4.815	....	2244	2315	....	3367	....	....	....	....	....	....
24.000	174.0	22.327	0.688	25.000	....	50.387	50.387	4.815	....	2426	2503	....	3640	....	4323	5006	5687	....	....
24.000	189.0	22.203	0.750	25.000	....	54.782	54.782	4.815	....	2637	2720	....	3957	....	4699	5441	6183	....	....
24.000	203.0	22.079	0.812	25.000	....	59.152	59.152	4.815	....	2848	2937	....	4272	....	5073	5873	6676	....	....
24.500	140.0	23.141	0.531	25.500	....	39.985	39.985	3.815	....	1905	2027	....	....	....	....	....	....	....	....
24.500	165.0	23.000	0.635	25.500	....	47.609	47.609	4.815	....	2268	2414	....	3511	....	....	....	....	....	....
24.500	182.0	22.785	0.709	25.500	....	52.992	52.992	4.815	....	2525	2687	....	3908	....	4640	5373	6105	....	....
24.500	207.0	22.579	0.812	25.500	....	60.427	60.427	4.815	....	2879	3063	....	4455	....	5290	6125	6962	....	....
26.000	207.0	24.203	0.750	27.500	....	59.494	59.494	4.815	....	2747	3201	....	4655	....	5528	....	....	....	....
26.000	223.0	24.079	0.812	27.500	....	64.254	64.254	4.815	....	2967	3456	....	5027	....	5969	....	....	....	....
26.000	237.0	24.000	0.866	27.500	....	68.380	68.380	4.815	....	3157	3679	....	5352	....	6355	7357	8360	....	....
26.000	270.0	23.703	1.000	27.500	....	78.540	78.540	4.815	....	3626	4225	....	6146	....	7298	8450	9603	....	....

Contact Mannesmann for running recommendations.

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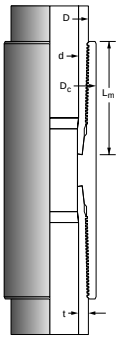


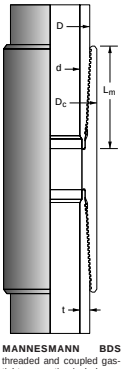
Mannesmann—Autocon

Type: Coupled, non-upset		Seal: Metal-to-metal							Minimum joint tension strength, kips				
D	w	d	t	D_c	D_{sc}	A_s	A_c	L_m	H-40	J-55	K-55	L-80	N-80
5.000	15.0	4.283	0.296	5.563	5.375	4.374	4.374	5.000	....	312	395	395	416
5.000	18.0	4.151	0.362	5.563	5.375	5.275	5.275	5.000	....	376	476	476	501
5.000	21.4	4.001	0.437	5.563	5.375	6.264	5.651	5.000	....	403	510	510	537
5.000	23.2	3.919	0.478	5.563	5.375	6.791	5.651	5.000	....	403	510	510	537
5.000	24.1	3.875	0.500	5.563	5.375	7.069	5.651	5.000	....	403	510	510	537
5.500	15.5	4.825	0.275	6.050	5.875	4.514	4.514	5.079	....	322	407	....	....
5.500	17.0	4.767	0.304	6.050	5.875	4.962	4.962	5.079	....	354	448	448	471
5.500	20.0	4.653	0.361	6.050	5.875	5.828	5.828	5.079	....	415	526	526	554
5.500	23.0	4.545	0.415	6.050	5.875	6.630	6.102	5.079	....	435	551	551	580
5.500	26.8	4.375	0.500	6.050	5.875	7.854	6.102	5.079	....	435	551	551	580
6.625	20.0	5.924	0.288	7.390	7.000	5.734	5.734	5.315	....	409	517	....	....
6.625	24.0	5.796	0.352	7.390	7.000	6.937	6.937	5.315	....	494	626	626	659
6.625	28.0	5.666	0.417	7.390	7.000	8.133	8.133	5.315	....	579	734	734	773
6.625	32.0	5.550	0.475	7.390	7.000	9.177	9.177	5.315	....	654	828	828	872
6.625	35.0	5.450	0.525	7.390	7.000	10.061	9.882	5.315	....	704	892	892	939
7.000	23.0	6.250	0.317	7.656	7.375	6.655	6.655	5.472	....	474	601	601	632
7.000	26.0	6.151	0.362	7.656	7.375	7.549	7.549	5.472	....	538	681	681	717
7.000	29.0	6.059	0.408	7.656	7.375	8.449	8.449	5.472	....	602	763	763	803
7.000	32.0	6.000	0.453	7.656	7.375	9.317	9.221	5.472	....	657	832	832	876
7.000	35.0	5.879	0.498	7.656	7.375	10.172	9.221	5.472	....	657	832	832	876
7.000	38.0	5.795	0.540	7.656	7.375	10.959	9.221	5.472	....	657	832	832	876

Mannesmann—BDS

Type: Coupled		Seal: Metal-to-metal							Minimum joint tension strength, kips				
D	w	d	t	D_c	D_{sc}	A_s	A_c	L_m	H-40	J-55	K-55	L-80	N-80
5.000	15.0	4.283	0.296	5.563	5.375	4.734	4.374	4.673	....	312	395	395	416
5.000	18.0	4.151	0.362	5.563	5.375	5.275	5.275	4.673	....	376	476	476	501
5.000	21.4	4.001	0.437	5.563	5.375	6.264	5.640	4.673	....	403	510	510	537
5.000	23.2	3.919	0.478	5.563	5.375	6.791	5.640	4.673	....	403	510	510	537
5.000	24.1	3.875	0.500	5.563	5.375	7.069	5.640	4.673	....	403	510	510	537
5.000	27.0	3.755	0.560	5.563	5.375	7.811	5.640	4.673	....	403	510	510	537
5.000	29.2	3.625	0.625	5.563	5.375	8.590	5.640	4.673	....	403	510	510	537
5.000	31.6	3.501	0.687	5.563	5.375	9.309	5.640	4.673	....	403	510	510	537
5.500	15.5	4.825	0.275	6.050	5.875	4.514	4.514	4.736	....	322	407	....	....
5.500	17.0	4.767	0.304	6.050	5.875	4.962	4.962	4.736	....	354	448	448	471
5.500	20.0	4.653	0.361	6.050	5.875	5.828	5.828	4.736	....	415	526	526	554
5.500	23.0	4.545	0.415	6.050	5.875	6.630	6.099	4.736	....	435	551	551	580
5.500	26.8	4.375	0.500	6.050	5.875	7.854	6.099	4.736	....	435	551	551	580
5.500	28.4	4.315	0.530	6.050	5.875	8.275	6.099	4.736	....	435	551	551	580
5.500	29.7	4.251	0.562	6.050	5.875	8.718	6.099	4.736	....	435	551	551	580
5.500	32.0	4.151	0.612	6.050	5.875	9.398	6.099	4.736	....	435	551	551	580
5.500	32.6	4.125	0.625	6.050	5.875	9.572	6.099	4.736	....	435	551	551	580
6.625	20.0	5.924	0.288	7.390	7.000	5.734	5.734	4.921	....	409	518	....	....
6.625	24.0	5.796	0.352	7.390	7.000	6.937	6.937	4.921	....	494	626	626	659
6.625	28.0	5.666	0.417	7.390	7.000	8.133	8.133	4.921	....	579	734	734	772
6.625	32.0	5.550	0.475	7.390	7.000	9.177	9.177	4.921	....	704	892	892	939
6.625	35.0	5.376	0.525	7.390	7.000	10.061	9.883	4.921	....	704	892	892	939
6.625	36.7	5.250	0.562	7.390	7.000	10.705	9.883	4.921	....	704	892	892	939
6.625	40.2	5.250	0.625	7.390	7.000	11.781	9.883	4.921	....	704	892	892	939
7.000	23.0	6.250	0.317	7.656	7.375	6.655	6.656	5.110	....	474	601	601	632
7.000	26.0	6.151	0.362	7.656	7.375	7.549	7.549	5.110	....	538	681	681	717
7.000	29.0	6.059	0.408	7.656	7.375	8.449	8.449	5.110	....	602	762	762	802
7.000	32.0	6.000	0.453	7.656	7.375	9.317	9.226	5.110	....	657	832	832	876
7.000	35.0	5.879	0.498	7.656	7.375	10.172	9.226	5.110	....	657	832	832	876
7.000	38.0	5.795	0.540	7.656	7.375	10.959	9.226	5.110	....	657	832	832	876
7.000	41.0	5.695	0.590	7.656	7.375	11.881	9.226	5.110	....	657	832	832	876
7.000	42.7	5.625	0.625	7.656	7.375	12.517	9.226	5.110	....	657	832	832	876
7.625	26.4	6.844	0.328	8.500	8.125	7.519	7.519	5.299	....	536	679	679	714
7.625	29.7	6.750	0.375	8.500	8.125	8.541	8.514	5.299	....	609	771	771	812
7.625	33.7	6.540	0.430	8.500	8.125	9.720	9.716	5.299	....	692	877	877	923
7.625	39.0	6.500	0.500	8.500	8.125	11.192	11.192	5.299	....	797	1010	1010	1063
7.625	41.0	6.500	0.537	8.500	8.125	11.958	11.958	5.299	....	853	1080	1080	1137
7.625	42.8	6.376	0.562	8.500	8.125	12.470	12.470	5.299	....	888	1125	1125	1184
7.625	45.3	6.310	0.595	8.500	8.125	13.141	13.048	5.299	....	929	1177	1177	1239
7.625	47.1	6.250	0.625	8.500	8.125	13.744	13.048	5.299	....	929	1177	1177	1239
7.750	46.1	6.500	0.595	8.500	8.125	13.374	13.036	5.299	....	929	1177	1177	1239
8.625	28.0	7.892	0.304	9.625	9.125	7.947	7.947	5.606	....	566	717	....	....
8.625	32.0	7.875	0.352	9.625	9.125	9.149	9.149	5.606	....	652	826	826	869
8.625	36.0	7.700	0.400	9.625	9.125	10.336	10.336	5.606	....	736	933	933	982
8.625	40.0	7.625	0.450	9.625	9.125	11.557	11.557	5.606	....	823	1043	1043	1098
8.625	44.0	7.500	0.500	9.625	9.125	12.763	12.763	5.606	....	909	1152	1152	1212
8.625	49.0	7.386	0.557	9.625	9.125	14.118	14.118	5.606	....	1006	1274	1274	1341
8.625	52.0	7.310	0.595	9.625	9.125	15.010	15.010	5.606	....	1069	1354	1354	1426
8.625	54.0	7.250	0.625	9.625	9.125	15.708	15.708	5.606	....	1119	1418	1418	1492
9.625	40.0	8.750	0.395	10.625	10.125	11.454	11.454	5.606	....	816	1033	1033	1088
9.625	43.5	8.625	0.435	10.625	10.125	12.559	12.559	5.606	....	895	1134	1134	1193
9.625	47.0	8.625	0.472	10.625	10.125	13.572	13.572	5.606	....	967	1225	1225	1289
9.625	53.5	8.500	0.545	10.625	10.125	15.546	15.546	5.606	....	1107	1403	1403	1477
9.625	58.4	8.375	0.595	10.625	10.125	16.879	16.879	5.606	....	1202	1523	1523	1603
9.625	59.4	8.251	0.609	10.625	10.125	17.250	17.250	5.606	....	1229	1557	1557	1639
9.625	61.1	8.219	0.625	10.625	10.125	17.671	17.671	5.606	....	1259	1595	1595	1679
9.750	59.2	8.500	0.595	10.625	10.125	17.671	17.671	5.606	....	1084	1373	1373	1445
9.875	62.6	8.500	0.625	10.625	10.125	18.162	18.162	5.606	....	1021	1294	1294	1362
10.750	40.5	9.894	0.350	11.750	11.250	11.435	11.435	5.606	....	815	1032	....	....
10.750	45.5	9.875	0.400	11.750	11.250	13.006	13.006	5.606	....	927	1174	....	....
10.750	51.0	9.694	0.450	11.750	11.250	14.561	14.561	5.606	....	1037	1314	1314	1383
10.750	55.5	9.625	0.495	11.750	11.250	15.947	15.947	5.606	....	1136	1439	1439	1515
10.750	60.7	9.504	0.545	11.750	11.250	17.473	17.473	5.606	....	1245	1577	1577	1660
10.750	65.7	9.500	0.595	11.750	11.250	18.982	18.496	5.606	....	1352	1713	1713	1803
10.750	68.8	9.322	0.636	11.750	11.250	20.208	18.496	5.606	....	1439	1823	1823	1919
11.750	47.0	10.844	0.375	12.750	11.937	13.401	13.400	5.606	....	955	1210	....	....
11.750	54.0	10.724	0.435	12.750	11.937	15.463	15.463	5.606	....	1102	1396	1396	1469
11.750	60.0	10.625	0.489	12.750	11.937	17.300	17.300	5.606	....	1233	1561	1561	1643
11.750	65.0	10.625	0.534	12.750	11.937	18.816	18.816	5.606	....	1340	1698	1698	1787
11.750	71.0	10.430	0.582	12.750	11.937	20.420	20.420	5.606	....	1455	1843	1843	1940

MANNESMANN Autocon connection utilizes the new autocon sealing system consisting of a self-contouring seat and a metal-to-metal seal. Its excellent performance capabilities with regard to high torque, heavy bending, high temperature and extreme combined loads according to the performance envelope were confirmed by extensive testing. Multiple field experience with running the connection in horizontal wells has proven the fast, easy and safe make-up and handling behavior during testing.



MANNESMANN BDS threaded and coupled gas-tight connection includes an elastic metal-to-metal seal, combined with a 15° internal shoulder for gas-tightness even under combined loads and elevated temperatures. Buttress thread form with 5 threads per in. and 1:16 taper combine for joint strength generally greater than pipe-body yield strength. Low hoop stresses and gas-tight metal seal make it ideal for sour service and CRA applications.

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C-90	C/T-95	P-110	Q-125	MW-100SS	MW-110SS	MW-140	MW-150	MW-155
416	436	519	561	457	499	623	665	686
501	526	626	676	551	626	752	802	827
537	564	671	725	591	671	805	859	886
537	564	671	725	591	671	805	859	886
537	564	671	725	591	671	805	859	886
....	....	....	....	....	....	....	....	....
471	495	589	636	519	589	707	754	778
554	581	692	747	609	692	831	886	914
580	609	725	783	638	725	870	928	956
580	609	725	783	638	725	870	928	956
....	....	....	....	....	....	....	....	....
659	692	824	890	725	824	989	1054	1087
773	811	966	1043	850	966	1159	1236	1275
872	915	1090	1177	959	1090	1308	1395	1439
939	986	1173	1267	1033	1173	1408	1502	1549
632	664	790	854	695	790	948	1012	1043
717	753	896	968	789	896	1076	1147	1183
803	843	1003	1084	883	1003	1204	1284	1324
876	920	1095	1183	964	1095	1314	1402	1445
876	920	1095	1183	964	1095	1314	1402	1445
876	920	1095	1183	964	1095	1314	1402	1445

C-90	C/T-95	P-110	Q-125	MW-100SS	MW-110SS	MW-140	MW-150	MW-155
416	436	520	561	457	499	623	665	686
501	526	626	676	551	601	751	801	826
537	564	671	725	589	643	805	859	886
537	564	671	725	589	643	805	859	886
537	564	671	725	589	643	805	859	886
537	564	671	725	589	643	805	859	886
537	564	671	725	589	643	805	859	886
537	564	671	725	589	643	805	859	886
....	....	....	....	....	....	....	....	....
471	495	589	636	519	566	707	754	778
554	581	692	478	609	664	831	886	914
580	609	725	783	637	695	869	927	956
580	609	725	783	637	695	869	927	956
580	609	725	783	637	695	869	927	956
580	609	725	783	637	695	869	927	956
580	609	725	783	637	695	869	927	956
580	609	725	783	637	695	869	927	956
....	....	....	....	....	....	....	....	....
659	692	824	890	725	791	988	1054	1087
772	811	966	1043	850	927	1159	1236	1275
939	986	1173	1267	959	1046	1408	1502	1549
939	986	1173	1267	1033	1127	1408	1502	1549
939	986	1173	1267	1033	1127	1408	1502	1549
939	986	1173	1267	1033	1127	1408	1502	1549
632	664	790	853	695	759	948	1011	1043
717	753	896	968	789	861	1075	1147	1183
802	843	1003	1083	883	963	1204	1284	1324
876	920	1095	1183	964	1052	1314	1402	1445
876	920	1095	1183	964	1052	1314	1402	1445
876	920	1095	1183	964	1052	1314	1402	1445
876	920	1095	1183	964	1052	1314	1402	1445
876	920	1095	1183	964	1052	1314	1402	1445
714	750	893	964	786	857	1071	1143	1178
812	852	1015	1096	890	971	1218	1299	1340
923	969	1154	1246	1015	1108	1385	1477	1523
1063	1116	1329	1435	1170	1276	1595	1701	1754
1137	1194	1421	1535	1250	1363	1705	1819	1876
1184	1244	1480	1599	1303	1422	1776	1895	1954
1239	1301	1549	1673	1364	1487	1859	1983	2044
1239	1301	1549	1673	1364	1487	1859	1983	2044
1239	1301	1549	1673	1362	1486	1859	1983	2044
....	....	....	....	....	....	....	....	....
869	912	1086	1173	956	1043	1304	1390	1434
982	1031	1227	1326	1080	1178	1473	1571	1620
1098	1153	1372	1482	1208	1318	1647	1757	1812
1212	1273	1516	1637	1334	1455	1819	1940	2001
1341	1408	1677	1811	1475	1609	2012	2146	2213
1426	1497	1782	1925	1569	1711	2139	2281	2352
1492	1567	1865	2015	1641	1791	2238	2388	2462
1088	1142	1360	1469	1197	1306	1632	1740	1795
1193	1253	1492	1611	1312	1432	17890	1909	1969
1289	1354	1612	1741	1418	1547	1934	2063	2128
1477	1550	1846	1993	1625	1772	2215	2363	2436
1603	1683	2004	2164	1764	1924	2405	2565	2645
1639	1721	2048	2212	1803	1966	2458	2622	2704
1679	1763	2098	2266	1847	2015	2518	2686	2770
1445	1517	1806	1951	1847	2014	2168	2312	2384
1362	1430	1702	1838	1898	2071	2043	2179	2247
....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....
1383	1452	1729	1867	1522	1660	2075	2213	2282
1515	1590	1893	2045	1667	1818	2272	2423	2499
1660	1743	2074	2240	1826	1992	2489	2655	2738
1803	1893	2254	2434	1933	2109	2704	2885	2975
1919	2015	2399	2591	1933	2109	2879	3071	3167
....	....	....	....	....	....	....	....	....
1469	1543	1836	1983	1616	1763	2204	2351	2424
1643	1726	2054	2219	1808	1972	2465	2629	2712
1787	1876	2234	2413	1966	2145	2681	2859	2949
1940	2036	2424	2618	2134	2328	2909	3103	3200

Table continues

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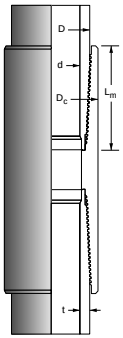
Mannesmann—BDS (continued)

D	w	d	t	D_c	D_{sc}	A_t	A_s	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80
11.750	75.0	10.358	0.618	12.750	11.937	21.613	21.613	5.606	....	1540	1951	1951	2054
11.750	79.0	10.282	0.656	12.750	11.937	22.863	22.412	5.606	....	1597	2023	2023	2129
11.875	71.8	10.625	0.582	12.750	11.937	20.648	18.329	5.606	....	1306	1654	1654	1741
12.750	57.6	11.728	0.433	13.750	12.937	16.755	16.755	5.606	....	1194	1512	1512	1592
12.750	65.1	11.610	0.492	13.750	12.937	18.947	18.947	5.606	....	1350	1710	1710	1800
12.750	70.1	11.532	0.531	13.750	12.937	20.384	20.384	5.606	....	1454	1841	1841	1938
12.750	84.1	11.375	0.625	13.750	12.937	23.807	23.807	5.606	....	1696	2149	2149	2262
13.375	54.5	12.459	0.380	14.375	13.559	15.513	15.514	5.606	....	1105	1400	....	....
13.375	61.0	12.359	0.430	14.375	13.559	17.487	17.487	5.606	....	1246	1578	1578	1661
13.375	68.0	12.259	0.480	14.375	13.559	19.445	19.445	5.606	....	1385	1755	1755	1847
13.375	72.0	12.250	0.514	14.375	13.559	20.768	20.768	5.606	....	1480	1875	1875	1974
13.375	77.0	12.119	0.550	14.375	13.559	22.160	22.160	5.606	....	1579	2000	2000	2105
13.375	80.7	12.059	0.580	14.375	13.559	23.314	23.314	5.606	....	1661	2104	2104	2215
13.375	85.0	12.003	0.608	14.375	13.559	24.386	24.386	5.606	....	1737	2200	2200	2316
13.375	86.0	12.000	0.625	14.375	13.559	25.035	25.035	5.606	....	1784	2260	2260	2379
13.500	81.4	12.250	0.580	14.375	13.559	23.542	23.452	5.606	....	1677	2124	2124	2236
13.625	88.2	12.250	0.625	14.375	13.559	25.525	20.224	5.606	....	1441	1825	1825	1921



MANNESMANN HPC is a threaded and coupled gas-tight connection for high pressures and deep wells. Four threads per in. and 1:12 taper permit deep stabbing and fast running times without cross threading. It is ideal for heavy wall casing strings with high axial loads.

Mannesmann—HPC

Type: Coupled Seal: Metal-to-metal

D	w	d	t	D_c	D_{sc}	A_t	A_s	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80
5.000	27.0	3.755	0.560	5.750	....	7.811	7.811	6.750	....	....	705	705	742
5.000	29.2	3.625	0.625	5.875	....	8.590	8.590	6.750	....	....	775	775	816
5.000	31.6	3.501	0.687	6.000	....	9.309	9.309	6.750	....	....	840	840	884
5.500	32.6	4.125	0.625	6.375	....	9.572	9.572	6.750	....	....	864	864	909
5.500	35.3	4.001	0.687	6.500	....	10.388	10.388	6.750	....	....	937	937	987
5.500	38.0	3.875	0.750	6.500	....	11.192	11.192	6.750	....	....	1013	1013	1067
5.500	40.5	3.751	0.812	6.500	....	11.959	11.959	6.750	....	....	1079	1079	1136
5.500	43.1	3.625	0.875	6.500	....	12.714	12.714	7.488	....	....	1147	1147	1208
6.625	40.2	5.250	0.625	7.500	....	11.781	11.781	6.750	....	....	1063	1063	1119
6.625	43.7	5.126	0.687	7.625	....	12.816	12.816	6.750	....	....	1157	1157	1218
6.625	47.1	5.000	0.750	7.625	....	13.843	13.843	6.750	....	....	1255	1255	1321
6.625	50.4	4.876	0.812	7.625	....	14.829	14.829	7.488	....	....	1338	1338	1409
6.625	53.7	4.750	0.875	7.625	....	15.806	15.806	7.488	....	....	1427	1427	1502
6.625	56.8	4.626	0.937	7.750	....	16.744	16.744	7.488	....	....	1511	1511	1591
6.625	63.2	4.376	1.062	8.000	....	18.560	18.560	8.500	....	....	1676	1676	1765
6.625	65.8	4.250	1.125	8.000	....	19.439	19.439	8.500	....	....	1754	1754	1847
6.625	71.4	4.000	1.250	8.000	....	21.108	21.108	8.500	....	....	1905	1905	2005
7.000	46.0	5.535	0.670	8.000	....	13.324	13.324	6.750	....	....	1202	1202	1266
7.000	50.1	5.375	0.750	8.000	....	14.726	14.258	6.750	....	....	1329	1329	1399
7.000	53.6	5.251	0.812	8.000	....	15.785	15.785	6.750	....	....	1425	1425	1500
7.000	57.1	5.125	0.875	8.000	....	16.837	16.837	7.488	....	....	1520	1520	1600
7.000	60.5	5.001	0.937	8.125	....	17.847	17.847	8.500	....	....	1611	1611	1696
7.000	66.6	4.781	1.047	8.125	....	19.581	19.581	8.500	....	....	1767	1767	1860
7.000	70.3	4.625	1.125	8.125	....	20.764	20.764	8.500	....	....	1874	1874	1973
7.000	76.3	4.375	1.250	8.250	....	22.580	22.580	8.500	....	....	2038	2038	2145
7.625	51.2	6.126	0.687	8.625	....	14.974	14.974	6.750	....	....	1351	1351	1198
7.625	55.3	6.000	0.750	8.750	....	16.199	16.199	6.750	....	....	1462	1462	1539
7.625	59.2	5.876	0.812	8.750	....	17.380	17.380	6.750	....	....	1569	1569	1651
7.625	63.2	5.750	0.875	8.750	....	18.555	18.555	7.488	....	....	1675	1675	1763
7.625	66.9	5.626	0.937	8.875	....	19.687	19.687	7.488	....	....	1777	1777	1870
7.625	70.7	5.500	1.000	8.875	....	20.813	20.813	8.500	....	....	1878	1878	1977
7.625	74.8	5.376	1.062	8.875	....	21.897	21.897	8.500	....	....	1976	1976	2080
7.625	77.9	5.250	1.125	8.875	....	22.973	22.973	8.500	....	....	2073	2073	2182
7.625	82.1	5.100	1.200	8.875	....	24.222	24.222	8.500	....	....	2186	2186	2301
7.625	84.8	5.000	1.250	8.875	....	25.035	25.035	8.500	....	....	2259	2259	2378
8.000	58.5	6.375	0.750	9.125	....	17.082	17.082	6.750	....	....	1542	1542	1623
8.000	62.7	6.251	0.812	9.125	....	18.336	18.336	6.750	....	....	1655	1655	1742
8.000	66.9	6.125	0.875	9.125	....	19.586	19.586	7.488	....	....	1768	1768	1861
8.000	71.0	6.001	0.937	9.125	....	20.791	20.791	7.488	....	....	1876	1876	1975
8.625	58.7	7.126	0.687	9.750	....	17.132	17.132	6.750	....	....	1546	1546	1628
8.625	68.1	6.876	0.812	9.750	....	19.931	19.931	6.750	....	....	1799	1799	1893
8.625	72.7	6.750	0.875	9.750	....	21.304	21.304	7.488	....	....	1923	1923	2024
8.625	81.5	6.500	1.000	9.750	....	23.955	23.955	8.500	....	....	2162	2162	2276
8.625	86.1	6.374	1.063	9.750	....	25.253	25.253	8.500	....	....	2279	2279	2399
8.625	90.0	6.250	1.125	9.750	....	26.507	26.507	8.500	....	....	2392	2392	2518
9.625	64.9	8.125	0.672	10.750	....	18.901	18.901	6.750	....	....	1706	1706	1796
9.625	70.3	8.001	0.734	10.750	....	20.502	20.502	6.750	....	....	1850	1850	1948
9.625	71.8	7.969	0.750	10.750	....	20.911	20.911	6.750	....	....	1887	1887	1987
9.625	75.6	7.875	0.797	10.750	....	22.104	22.104	6.750	....	....	1995	1995	2100
9.625	80.8	7.751	0.859	10.750	....	23.656	23.656	7.488	....	....	2135	2135	2247
9.625	86.0	7.624	0.922	10.875	....	25.209	25.209	7.488	....	....	2275	2275	2395
9.625	92.0	7.469	1.000	10.875	....	27.096	27.096	7.488	....	....	2445	2445	2574
10.000	67.5	8.500	0.672	11.125	....	19.693	19.693	6.750	....	....	1777	1777	1871
10.000	68.9	8.500	0.688	11.125	....	20.127	20.127	6.750	....	....	1818	1818	1912
10.750	73.2	9.250	0.672	11.875	....	21.276	21.276	6.750	....	....	1920	1920	2021
10.750	79.2	9.126	0.734	12.000	....	23.096	23.096	6.750	....	....	2084	2084	2194
10.750	85.3	9.000	0.797	12.000	....	24.921	24.921	6.750	....	....	2249	2249	2367
10.750	97.1	8.750	0.922	12.000	....	28.467	28.467	7.488	....	....	2569	2569	2704
10.750	108.7	8.500	1.047	12.000	....	31.916	31.916	8.500	....	....	2880	2880	3032
11.750	79.0	10.282	0.656	12.875	....	22.863	22.863	6.750	....	....	2063	2063	2172
11.750	83.0	10.212	0.691	12.875	....	24.007	24.007	6.750	....	....	2167	2167	2281
11.750	99.0	9.898	0.848	13.000	....	29.044	29.044	6.750	....	....	2621	2621	2759
11.750	109.9	9.694	0.950	12.125	....	32.233	32.233	7.488	....	....	2909	2909	3062
12.750	84.1	11.375	0.625	13.875	....	23.807	23.807	6.750	....	....	2149	2149	2262
13.375	92.0	11.879	0.670	14.500	....	26.742	26.742	6.750	....	....	2413	2413	2541
13.375	96.0	11.819	0.700	14.500	....	27.874	27.874	6.750	....	....	2516	2516	2648
13.375	116.5	11.479	0.870	14.625	....	34.178	34.178	6.750	....	....	3085	3085	3247
13.375	122.7	11.379	0.920	14.625	....	35.998	35.998	7.488	....	....	3249	3249	3420
14.000	103.5	12.337	0.720	15.250	....	30.039	30.039	6.750	....	....	2711	2711	2854
14.000	110.0	12.250	0.772	15.250	....	32.082	32.082	6.750	....	....	2895	2895	3048
14.000	120.0	12.077	0.850	15.250	....	35.115	35.115	7.488	....	....	3169	3169	3336
14.000	127.0	12.001	0.906	15.250	....	37.269	37.269	7.488	....	....	3364	3364	3541
16.000	118.0	14.341	0.715	17.250	....	34.334	34.334	6.750	....	....	3099	3099	3262
16.000	128.0	12.229	0.781	17.375	....	37.341	37.341	6.750	....	....	3370	3370	3547
16.000	138.0	14.075	0.850	17.250	....	40.456	40.456	7.488	....	....	3651	3651	3843
16.000	147.0	14.000	0.906	17.375	....	42.962	42.962	7.488	....	....	3877	3877	4081

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C-90	C/T-95	P-110	Q-125	MW-100SS	MW-110SS	MW-140	MW-150	MW-155
2054	2156	2567	2772	2259	2464	3080	3286	3388
2129	2236	2661	2874	2342	2555	3191	3407	3513
1741	1828	2177	2351	1915	2090	2612	2786	2873
1592	1672	1990	2149	1751	1910	2388	2547	2627
1800	1890	2250	2431	1980	2160	2701	2881	2971
1938	2035	2423	2617	2130	2324	2907	3101	3198
2262	2375	2827	3053	2488	2714	3393	3619	3732
1661	1744	2076	2242	1827	1994	2491	2658	2741
1847	1939	2309	2493	2032	2217	2771	2955	3048
1974	2072	2467	2664	2170	2368	2960	3158	3256
2105	2210	2632	2842	2316	2526	3158	3568	3474
2215	2325	2768	2990	2436	2658	3322	3543	3654
2316	2432	2895	3127	2548	2780	3474	3706	3822
2379	2498	2974	3212	2616	2854	3568	3806	3925
2236	2348	2795	3019	2451	2674	3354	3578	3690
1921	2017	2402	2594	2113	2306	2882	3074	3170

C-90	C/T-95	P-110	Q-125	MW-100SS	MW-110SS	MW-140	MW-150	MW-155
742	779	928	1002	816	890	1113	1187	1224
816	857	1020	1102	898	979	1224	1306	1347
884	929	1105	1194	973	1061	1326	1415	1459
909	955	1137	1228	1000	1091	1364	1455	1500
987	1036	1234	1332	1086	1184	1480	1579	1628
1067	1120	1334	1440	1170	1276	1600	1707	1760
1136	1193	1420	1534	1250	1363	1704	1818	1875
1208	1268	1510	1631	1329	1449	1812	1932	1993
1119	1175	1399	1511	1231	1343	1679	1791	1847
1218	1278	1522	1644	1339	1461	1826	1948	2009
1321	1387	1651	1784	1447	1578	1982	2114	2180
1409	1479	1761	1902	1550	1690	2113	2254	2324
1502	1577	1877	2027	1652	1802	2252	2403	2478
1591	1670	1988	2147	1750	1909	2386	2545	2625
1765	1853	2206	2382	1940	2116	2647	2823	2912
1847	1939	2308	2493	2031	2216	2770	2955	3047
2005	2105	2507	2707	2206	2406	3008	3208	3309
1266	1329	1582	1709	1392	1519	1899	2025	2089
1399	1469	1749	1889	1490	1625	2098	2238	2308
1500	1575	1875	2024	1650	1800	2249	2399	2474
1600	1679	1999	2159	1759	1919	2399	2559	2639
1696	1780	2119	2289	1865	2035	2543	2713	2798
1860	1953	2325	2511	2046	2232	2790	2976	3069
1973	2071	2466	2663	2170	2367	2959	3156	3253
2145	2252	2681	2896	2360	2574	3218	3432	3539
1198	1494	1778	1920	1585	1707	2134	2276	2347
1539	1616	1924	2078	1693	1847	2308	2462	2539
1651	1734	2064	2229	1816	1981	2477	2642	2724
1763	1851	2203	2380	1939	2115	2644	2820	2909
1870	1964	2338	2525	2057	2244	2805	2992	3086
1977	2076	2472	2669	2175	2373	2966	3164	3262
2080	2184	2600	2808	2288	2496	3120	3328	3432
2182	2292	2728	2946	2401	2619	3274	3492	3601
2301	2416	2876	3106	2531	2761	3452	3682	3797
2378	2497	2973	3211	2616	2854	3567	3805	3924
1623	1704	2029	2191	1785	1947	2434	2597	2678
1742	1829	2177	2352	1916	2090	2613	2787	2874
1861	1954	2326	2512	2047	2233	2791	2977	3070
1975	2074	2469	2666	2173	2370	2963	3160	3259
1628	1709	2034	2197	1790	1953	2441	2604	2686
1893	1988	2367	2556	2083	2272	2840	3029	3124
2024	2125	2530	2732	2226	2429	3036	3238	3339
2276	2389	2845	3072	2503	2731	3414	3641	3755
2399	2519	2999	3239	2639	2879	3599	3839	3958
2518	2644	3148	3400	2770	3022	3777	4029	4155
1796	1885	2295	2424	1975	2155	2693	2873	2963
1948	2045	2435	2629	2142	2337	2922	3116	3214
1987	2086	2483	2682	2185	2384	2980	3179	3278
2100	2205	2626	2835	2310	2520	3150	3360	3465
2247	2360	2809	3034	2472	2697	3371	3596	3708
2395	2515	2994	3233	2634	2874	3592	3832	3951
2574	2703	3218	3475	2832	3089	3861	4119	4247
1871	1964	2339	2526	2058	2245	2806	2993	
30874								
1912	2008	2390	2581	2103	2294	2868	3059	3155
2021	2122	2527	2729	2223	2425	3032	3234	3335
2194	2304	2743	2962	2414	2633	3291	3511	3620
2367	2486	2959	3196	2604	2841	3551	3788	3906
2704	2840	3380	3651	2975	3245	4057	4327	4462
3032	3184	3790	4093	3335	3638	4548	4851	4947
2172	2281	2715	2932	2389	2606	3258	3475	3584
2281	2395	2851	3079	2509	2737	3421	3649	3763
2759	2897	3449	3725	3035	3311	4139	4415	4553
3062	3215	3828	4134	3368	3675	4593	4899	5052
2262	2375	2828	3053	2488	2714	3392	3619	3732
2541	2668	3176	3444	2795	3049	3811	4065	4192
2648	2780	3310	3575	2913	3178	3972	4237	4369
3247	3409	4059	4383	3572	3896	4870	5195	5357
3420	3591	4275	4617	3762	4104	5130	5477	5643
2854	2996	3567	3852	3139	3424	4281	4566	4709
3048	3200	3810	4115	3353	3657	4572	4876	5029
3336	3505	4170	4504	3670	4003	5004	5338	5504
3541	3718	4426	4780	3895	4249	5311	5665	5842
3262	3425	4077	4403	3588	3914	4893	5219	5382
3547	3725	4434	4789	3902	4257	5321	5676	5853
3843	4035	4804	5188	4228	4612	5765	6149	6341

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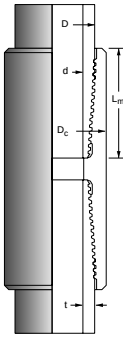
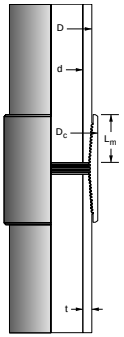


MANNESMANN MAT threaded and coupled connection provides leak resistance superior to API Buttress. Connection joint strength is generally greater than pipe body yield strength. The internal torque shoulder controls hoop stresses and the flush internal surface eliminates turbulance in production environments.

Mannesmann—MAT

Type: Coupled, non-upset **Seal: Threaded**

D	w	d	t	D_c	D_{sc}	A_s	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80
5.000	15.0	4.283	0.296	5.563	5.375	4.374	4.374	3.825	....	312	395	395	416
5.000	18.0	4.151	0.362	5.563	5.375	5.275	5.101	3.825	....	363	460	460	485
5.000	21.4	4.001	0.437	5.563	5.375	6.264	5.101	3.825	....	363	460	460	485
5.000	23.2	3.919	0.478	5.563	5.375	6.791	5.101	3.825	....	363	460	460	485
5.000	24.1	3.875	0.500	5.563	5.375	7.069	5.101	3.825	....	363	460	460	485
5.500	15.5	4.825	0.275	6.050	5.875	4.514	4.514	4.736	....	322	407	....	....
5.500	17.0	4.767	0.304	6.050	5.875	4.962	4.962	4.736	....	354	448	448	471
5.500	20.0	4.653	0.361	6.050	5.875	5.828	5.828	4.736	....	415	526	526	554
5.500	23.0	4.545	0.415	6.050	5.875	6.630	6.630	4.736	....	472	598	598	630
5.500	26.8	4.375	0.500	6.050	5.875	7.854	6.914	4.736	....	493	624	624	657
5.500	28.4	4.315	0.530	6.050	5.875	8.275	6.914	4.736	....	493	624	624	657
5.500	29.7	4.251	0.562	6.050	5.875	8.718	6.914	4.736	....	493	624	624	657
6.625	20.0	5.924	0.288	7.390	7.000	5.734	5.734	4.921	....	409	517	....	....
6.625	24.0	5.796	0.352	7.390	7.000	6.937	6.937	4.921	....	494	626	626	659
6.625	28.0	5.666	0.417	7.390	7.000	8.133	8.133	4.921	....	579	734	734	773
6.625	32.0	5.550	0.475	7.390	7.000	9.177	9.101	4.921	....	648	821	821	865
7.000	23.0	6.250	0.317	7.656	7.375	6.655	6.656	5.110	....	474	601	601	632
7.000	26.0	6.151	0.362	7.656	7.375	7.549	7.549	5.110	....	538	681	681	717
7.000	29.0	6.059	0.408	7.656	7.375	8.449	8.449	5.110	....	602	763	763	803
7.000	32.0	6.000	0.453	7.656	7.375	9.317	8.451	5.110	....	602	763	763	803
7.000	35.0	5.879	0.498	7.656	7.375	10.172	8.451	5.110	....	602	763	763	803
7.000	38.0	5.795	0.540	7.656	7.375	10.959	8.451	5.110	....	602	763	763	803
8.625	49.0	7.386	0.557	9.625	9.125	14.118	14.118	5.606	....	1006	1274	1274	1341
9.625	43.5	8.625	0.435	10.625	10.125	12.559	9.314	5.606	....	664	841	841	885
10.750	45.5	9.875	0.400	11.750	11.250	13.006	13.006	5.606	....	927	1174	....	....
10.750	51.0	9.694	0.450	11.750	11.250	14.561	14.561	5.606	....	1037	1314	1314	1383
10.750	55.5	9.625	0.495	11.750	11.250	15.947	15.947	5.606	....	1136	1439	1439	1515
11.750	47.0	10.844	0.375	12.750	11.937	13.401	11.461	5.606	....	817	1034	1034	1089



MANNESMANN Mid Omega threaded and coupled connection provides leak resistance superior to API Round and Buttress threads, increased joint strength and favorable stress distribution. Four threads per inch and 1:12 taper permit deep stabbing and fast running times without cross threading.

Mannesmann—Mid Omega

Type: Coupled **Type: Threaded**

D	w	d	t	D_c	D_{sc}	A_s	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80
9.625	36.0	8.765	0.352	10.625	....	10.254	10.254	5.722	....	731	925	....	....
9.625	40.0	8.750	0.395	10.625	....	11.454	11.454	5.722	....	816	1033	1033	1088
9.625	43.5	8.625	0.435	10.625	....	12.559	12.559	5.722	....	895	1134	1134	1193
9.625	47.0	8.625	0.472	10.625	....	13.572	13.572	5.722	....	967	1225	1225	1289
9.625	53.5	8.500	0.545	10.625	....	15.546	15.546	5.722	....	1107	1403	1403	1477
9.625	58.4	8.375	0.595	10.625	....	16.879	16.879	5.722	....	1202	1523	1523	1603
9.625	59.4	8.251	0.609	10.625	....	17.250	17.250	5.722	....	1229	1557	1557	1639
9.625	61.1	8.219	0.625	10.625	....	17.671	17.671	5.722	....	1259	1595	1595	1679
9.625	64.9	8.125	0.672	10.625	....	18.901	18.901	5.722	....	1347	1706	1706	1796
9.625	70.3	8.001	0.734	10.625	....	20.502	19.650	5.722	....	1400	1773	1773	1867
9.750	59.2	8.500	0.595	10.625	....	17.113	17.113	5.722	....	1084	1372	1372	1445
9.875	62.6	8.500	0.625	10.625	....	18.162	18.162	5.722	....	1022	1294	1294	1362
10.000	54.3	8.782	0.531	11.000	....	15.796	15.796	5.722	....	1126	1426	1426	1501
10.000	60.3	8.654	0.595	11.000	....	17.580	17.580	5.722	....	1252	1586	1586	1670
10.000	62.2	8.608	0.618	11.000	....	18.215	18.215	5.722	....	1298	1644	1644	1731
10.000	67.5	8.500	0.672	11.000	....	19.693	19.693	5.722	....	1403	1777	1777	1871
10.000	68.9	8.500	0.688	11.000	....	20.127	20.127	5.722	....	1434	1817	1817	1913
10.750	40.5	9.894	0.350	11.750	....	11.435	11.435	5.722	....	815	1032	....	....
10.750	45.5	9.875	0.400	11.750	....	13.006	13.006	5.722	....	927	1174	....	....
10.750	51.0	9.694	0.450	11.750	....	14.561	14.561	5.722	....	1037	1314	1314	1383
10.750	55.5	9.625	0.495	11.750	....	15.947	15.947	5.722	....	1136	1439	1439	1515
10.750	60.7	9.504	0.545	11.750	....	17.473	17.473	5.722	....	1245	1577	1577	1660
10.750	65.7	9.500	0.595	11.750	....	18.982	18.982	5.722	....	1352	1713	1713	1803
10.750	68.8	9.322	0.636	11.750	....	20.208	20.208	5.722	....	1439	1823	1823	1919
10.750	73.2	9.250	0.672	11.750	....	21.276	21.276	5.722	....	1516	1920	1920	2021
10.750	79.2	9.126	0.734	11.750	....	23.096	23.096	5.722	....	1550	1963	1963	2067
11.750	47.0	10.844	0.375	12.750	....	13.401	13.401	5.722	....	955	1210	....	....
11.750	54.0	10.724	0.435	12.750	....	15.463	15.463	5.722	....	1102	1396	1396	1469
11.750	60.0	10.625	0.489	12.750	....	17.300	17.300	5.722	....	1233	1561	1561	1643
11.750	65.0	10.625	0.534	12.750	....	18.816	18.816	5.722	....	1340	1698	1698	1787
11.750	71.0	10.430	0.582	12.750	....	20.420	20.420	5.722	....	1455	1843	1843	1940
11.750	75.0	10.358	0.618	12.750	....	21.613	21.613	5.722	....	1540	1951	1951	2054
11.875	71.8	10.625	0.582	12.750	....	20.648	20.648	5.722	....	136	1654	1654	1741
12.000	68.0	10.750	0.547	13.000	....	19.681	19.681	5.722	....	1402	1776	1776	1869
12.000	73.0	10.666	0.589	13.000	....	21.115	21.115	5.722	....	1504	1906	1906	2006
12.000	76.0	10.624	0.610	13.000	....	21.827	21.827	5.722	....	1555	1969	1969	2073
12.000	86.5	10.430	0.707	13.000	....	25.083	25.083	5.722	....	1718	2177	2177	2291
12.875	66.6	11.750	0.495	13.875	....	19.252	19.252	5.722	....	1371	1737	1737	1829
13.375	54.5	12.459	0.380	14.375	....	15.513	15.513	5.722	....	1105	1400	....	....
13.375	61.0	12.359	0.430	14.375	....	17.487	17.487	5.722	....	1246	1578	1578	1661
13.375	68.0	12.259	0.480	14.375	....	19.445	19.445	5.722	....	1385	1755	1755	1847
13.375	72.0	12.250	0.514	14.375	....	20.768	20.768	5.722	....	1480	1875	1875	1974
13.375	77.0	12.119	0.550	14.375	....	22.160	22.160	5.722	....	1579	2000	2000	2105
13.375	80.7	12.059	0.580	14.375	....	23.314	23.314	5.722	....	1661	2104	2104	2215
13.375	85.0	12.003	0.608	14.375	....	24.386	24.386	5.722	....	1737	2200	2200	2316
13.375	86.0	12.000	0.625	14.375	....	25.035	25.035	5.722	....	1784	2260	2260	2379
13.500	81.4	12.250	0.580	14.375	....	23.542	23.542	5.722	....	1489	1886	1886	1986
13.625	88.2	12.250	0.625	14.625	....	25.525	25.525	5.722	....	1818	2304	2304	2425
13.625	105.0	12.000	0.760	14.625	....	30.717	30.717	5.722	....	1936	2452	2452	2582

Contact Mannesmann for running recommendations.

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C-90	C/T-95	P-110	Q-125	MW-100SS	MW-110SS	MW-140	MW-150	MW-155
416	436	519	561	457	499	623	665	686
485	509	606	654	533	606	727	775	800
485	509	606	654	533	606	727	775	800
485	509	606	654	533	606	727	775	800
485	509	606	654	533	606	727	775	800
....	....	....	....	....	....	....	....	....
471	495	589	636	519	589	707	754	778
554	581	692	747	609	692	831	886	914
630	661	787	850	693	787	945	1008	1039
657	690	821	887	723	821	985	1051	1084
657	690	821	887	723	821	985	1051	1084
657	690	821	887	723	821	985	1051	1084
....	....	....	....	....	....	....	....	....
659	692	824	890	725	824	989	1054	1087
773	811	966	1043	850	966	1159	1236	1275
865	908	1081	1167	951	1081	1297	1383	1427
632	664	790	854	695	790	948	1012	1043
717	753	896	968	789	896	1076	1147	1183
803	843	1003	1084	883	1003	1204	1284	1324
803	843	1004	1084	883	1004	1204	1285	1325
803	843	1004	1084	883	1004	1204	1285	1325
803	843	1004	1084	883	1004	1204	1285	1325
1341	1408	1677	1811	1475	1677	2012	2146	2213
885	929	1106	1195	973	1106	1327	1416	1460
....	....	....	....	....	....	....	....	....
1383	1452	1729	1867	1522	1729	2075	2213	2282
1515	1591	1894	2045	1667	1894	2273	2424	2500
1089	1143	1361	1470	1198	1361	1633	1742	1797

C-90	C/T-95	P-110	Q-125	MW-100SS	MW-110SS	MW-140	MW-150	MW-155
....	....	....	....	....	....	....	....	....
1088	1142	1360	1469	1197	1306	1632	1740	1795
1193	1253	1492	1611	1312	1432	17890	1909	1969
1289	1354	1612	1741	1418	1547	1934	2063	2128
1477	1550	1846	1993	1625	1772	2215	2363	2436
1603	1683	2004	2164	1764	1924	2405	2565	2645
1639	1721	2049	2212	1803	1966	2458	2622	2704
1679	1763	2099	2267	1847	2015	2519	2687	2771
1796	1886	2245	2424	1975	2155	2694	2873	2963
1867	1960	2333	2520	2053	2240	2800	2987	3080
1445	1517	1806	1950	1788	1951	2167	2312	2384
1362	1430	1703	1839	1898	2071	2043	2180	2248
1501	1576	1876	2026	1651	1801	2251	2401	2476
1670	1753	2087	2254	1837	2004	2505	2672	2755
1731	1817	2163	2336	1903	2077	2596	2769	2856
1871	1964	2339	2526	2058	2245	2806	2994	3087
1913	2008	2391	2582	2103	2294	2869	3060	3156
....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....
1383	1452	1729	1867	1522	1660	2075	2213	2282
1515	1590	1893	2045	1667	1818	2272	2423	2499
1660	1743	2074	2240	1826	1992	2489	2655	2738
1803	1893	2254	2434	1984	2164	2704	2885	2975
1919	2015	2399	2591	2112	2304	2879	3071	3167
2021	2122	2527	2729	2223	2425	3032	3234	3335
2067	2170	2583	2790	2414	2633	3100	3306	3410
....	....	....	....	1400	1528	....	....	....
1469	1543	1836	1983	1616	1763	2204	2351	2424
1643	1726	2054	2219	1808	1972	2465	2629	2712
1787	1876	2234	2413	1966	2145	2681	2859	2949
1940	2036	2424	2618	2134	2328	2909	3103	3200
2054	2156	2567	2772	2259	2464	3080	3286	3388
1741	1828	2176	2350	2158	2354	2611	2785	2872
1869	1963	2337	2523	2057	2244	2804	2991	3084
2006	2106	2507	2708	2207	2407	3009	3209	3310
2073	2177	2591	2799	2281	2488	3110	3317	3421
2291	2409	2864	3093	2621	2859	3437	3666	3780
1829	1920	2286	2469	2012	2195	2743	2926	3017
....	....	....	....	....	....	....	....	....
1661	1744	2076	2242	1827	1994	2491	2658	2741
1847	1939	2309	2493	2032	2217	2771	2955	3048
1974	2072	2467	2664	2170	2368	2960	3158	3256
2105	2210	2632	2842	2316	2526	3158	3368	3474
2215	2325	2768	2990	2436	2658	3322	3543	3654
2316	2432	2895	3127	2548	2780	3474	3706	3822
2379	2498	2974	3212	2616	2854	3568	3806	3925
1986	2085	2482	2680	2460	2684	2978	3177	3276
2425	2546	3031	3274	2667	2910	3637	3880	4001
2582	2711	3227	3485	3210	3502	3872	4130	4260

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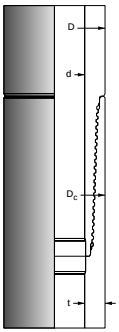


MANNESMANN MUST is an integral or threaded and coupled gas-tight connection for high internal pressures combined with external pressures and bending loads. Internal and external metal seals maintain gas tightness under combined loads.

Mannesmann—MUST

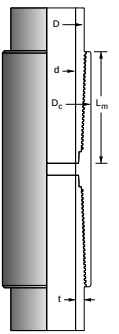
Type: Integral or coupled **Seal: Metal-to-metal**

D	w	d	t	D_c	D_{sc}	A_s	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80
5.500	32.0	4.151	0.612	5.500	....	9.398	4.892	4.528	....	....	....	442	465
7.625	53.0	6.000	0.712	7.625	....	15.463	9.689	5.984	....	....	....	874	920
7.625	59.0	5.879	0.811	7.625	....	17.361	9.689	5.984	....	....	....	874	920
8.625	85.8	6.000	1.062	8.976	....	25.233	14.707	6.665	....	....	....	1397	1471
10.750	109.0	8.500	1.033	10.750	....	31.534	18.214	6.177	....	....	....	1644	1730
10.750	109.0	8.500	1.033	11.025	....	31.534	15.965	6.177	....	....	....	1517	1597

Mannesmann—PRC

Type: Upset **Seal: Metal-to-metal**

D	w	d	t	D_c	D_{sc}	A_s	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80
8.625	46.4	7.500	0.500	9.655	....	12.763	16.516	5.598	....	909	1152	1152	1212
9.750	61.2	8.413	0.606	10.625	....	17.408	19.163	6.024	....	1240	1571	1571	1654
11.000	67.3	9.733	0.571	12.031	....	18.708	23.212	6.024	....	1333	1688	1688	1777
11.000	69.7	9.660	0.595	12.031	....	19.450	23.212	6.024	....	1386	1755	1755	1848
13.375	75.0	12.250	0.514	14.400	....	20.768	26.431	5.787	....	1480	1874	1874	1973



MANNESMANN PRC is available as an upset and threaded or as a weld-on connector. Internal metal-to-metal seal and external shoulder and seal maintain gas tightness even under high dynamic loading conditions. PRC is designed for production riser strings in deep water and rough offshore applications.

Nippon Steel Corp.—NS-CC

Type: Threaded, coupled **Seal: Metal-to-metal**

D	w	d	t	D_c	D_{sc}	A_s	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110
5.000	15.0	4.408	0.296	5.563	....	4.374	....	4.690	....	....	....	379	....	404	424	503
5.000	18.0	4.276	0.362	5.563	....	5.275	....	4.690	....	....	....	457	....	487	512	606
5.000	21.4	4.126	0.437	5.563	....	6.264	....	4.690	....	....	....	510	....	537	563	671
5.000	23.2	4.044	0.478	5.563	....	6.791	....	4.690	....	....	....	510	....	537	563	671
5.000	24.1	4.000	0.500	5.563	....	7.069	....	4.690	....	....	....	510	....	537	563	671
5.500	17.0	4.892	0.304	6.050	5.907	4.962	....	4.750	....	....	....	428	....	456	480	568
5.500	20.0	4.778	0.361	6.050	5.907	5.828	....	4.750	....	....	....	503	....	536	563	667
5.500	23.0	4.670	0.415	6.050	5.907	6.630	....	4.750	....	....	....	550	....	579	608	724
5.500	26.0	4.548	0.476	6.050	....	7.513	....	4.750	....	....	....	550	....	579	608	724
5.500	28.4	4.440	0.530	6.050	....	8.275	....	4.750	....	....	....	550	....	579	608	724
6.625	24.0	5.921	0.352	7.390	7.028	6.937	....	4.940	....	....	....	592	....	633	665	786
6.625	28.0	5.791	0.417	7.390	7.028	8.133	....	4.940	....	....	....	693	....	742	780	922
6.625	32.0	5.675	0.475	7.390	7.028	9.177	....	4.940	....	....	....	783	....	837	880	1040
7.000	23.0	6.366	0.317	7.625	7.407	6.655	....	5.130	....	....	....	565	....	605	636	752
7.000	26.0	6.276	0.362	7.625	7.407	7.549	....	5.130	....	....	....	641	....	687	722	853
7.000	29.0	6.184	0.408	7.625	7.407	8.449	....	5.130	....	....	....	718	....	768	808	955
7.000	32.0	6.094	0.453	7.625	7.407	9.317	....	5.130	....	....	....	791	....	847	891	1053
7.000	35.0	6.004	0.498	7.625	7.407	10.172	....	5.130	....	....	....	833	....	876	920	1096
7.000	38.0	5.920	0.540	7.625	7.407	10.959	....	5.130	....	....	....	833	....	876	920	1096
7.000	41.0	5.820	0.590	7.625	....	11.881	....	5.130	....	....	....	833	....	876	920	1096
7.000	42.7	5.750	0.625	7.625	....	12.517	....	5.130	....	....	....	833	....	876	920	1096
7.000	44.0	5.720	0.640	7.625	....	12.788	....	5.130	....	....	....	833	....	876	920	1096
7.625	26.4	6.969	0.328	8.500	8.157	7.519	....	5.320	....	....	....	635	....	681	716	845
7.625	29.7	6.875	0.375	8.500	8.157	8.541	....	5.320	....	....	....	721	....	773	813	960
7.625	33.7	6.765	0.430	8.500	8.157	9.720	....	5.320	....	....	....	820	....	880	925	1093
7.625	39.0	6.625	0.500	8.500	8.157	11.192	....	5.320	....	....	....	945	....	1013	1065	1258
7.625	42.8	6.501	0.562	8.500	....	12.470	....	5.320	....	....	....	1053	....	1129	1187	1402
7.625	45.3	6.435	0.595	8.500	....	13.141	....	5.320	....	....	....	1109	....	1189	1251	1477
7.625	47.1	6.375	0.625	8.500	....	13.744	....	5.320	....	....	....	1160	....	1238	1300	1545
8.625	36.0	7.825	0.400	9.625	9.157	10.336	....	5.640	....	....	....	864	....	928	976	1152
8.625	40.0	7.725	0.450	9.625	9.157	11.557	....	5.640	....	....	....	966	....	1038	1092	1288
8.625	44.0	7.625	0.500	9.625	9.157	12.763	....	5.640	....	....	....	1066	....	1146	1206	1423
8.625	49.0	7.511	0.557	9.625	9.157	14.118	....	5.640	....	....	....	1180	....	1268	1334	1574
8.625	52.0	7.435	0.595	9.625	....	15.010	....	5.640	....	....	....	1254	....	1348	1418	1673
9.625	40.0	8.835	0.395	10.625	....	11.454	....	5.640	....	....	....	947	....	1021	1074	1266
9.625	43.5	8.755	0.435	10.625	....	12.559	....	5.640	....	....	....	1038	....	1119	1178	1388
9.625	47.0	8.681	0.472	10.625	....	13.572	....	5.640	....	....	....	1122	....	1210	1273	1500
9.625	53.5	8.535	0.545	10.625	....	15.546	....	5.640	....	....	....	1285	....	1386	1458	1718
9.625	58.4	8.435	0.595	10.625	....	16.879	....	5.640	....	....	....	1396	....	1504	1583	1865
9.625	59.4	8.407	0.609	10.625	....	17.250	....	5.640	....	....	....	1426	....	1538	1618	1906
9.875	62.8	8.625	0.625	10.875	....	18.162	....	5.640	....	....	....	1498	....	1616	1700	2003
9.875	66.8	8.519	0.678	10.875	....	19.590	....	5.640	....	....	....	1616	....	1743	1834	2160
9.875	68.8	8.475	0.700	10.875	....	20.177	....	5.640	....	....	....	1664	....	1795	1888	2225
10.750	45.5	9.950	0.400	11.750	11.281	13.006	....	5.640	....	....	....	1063	....	1149	1209	1423
10.750	51.0	9.850	0.450	11.750	11.281	14.561	....	5.640	....	....	....	1190	....	1287	1354	1594
10.750	55.5	9.760	0.495	11.750	11.281	15.947	....	5.640	....	....	....	1303	....	1409	1483	1745
10.750	60.7	9.660	0.545	11.750	11.281	17.473	....	5.640	....	....	....	1428	....	1544	1625	1912
10.750	65.7	9.560	0.595	11.750	11.281	18.982	....	5.640	....	....	....	1551	....	1677	1765	2077
10.750	75.9	9.350	0.700	11.750	11.281	22.101	....	5.640	....	....	....	1954	....	2057	2160	2571
11.750	47.0	11.000	0.375	12.750	....	13.401	....	5.640	....	....	....	1084	....	1175	1237	1454
11.750	54.0	10.880	0.435	12.750	....	15.463	....	5.640	....	....	....	1250	....	1356	1427	1677
11.750	60.0	10.772	0.489	12.750	....	17.300	....	5.640	....	....	....	1399	....	1517	1596	1877
11.750	65.0	10.682	0.534	12.750	....	18.816	....	5.640	....	....	....	1521	....	1650	1736	2041
12.063	78.1	10.781	0.641	13.092	....	23.001	....	5.640	....	....	....	1854	....	2012	2117	2488
13.375	54.5	12.615	0.380	14.375	....	15.513	....	5.640	....	....	....	1233	....	1343	1414	1659
13.375	61.0	12.515	0.430	14.375	....	17.487	....	5.640	....	....	....	1389	....	1514	1594	1870
13.375	68.0	12.415	0.480	14.375	....	19.445	....	5.640	....	....	....	1545	....	1683	1772	2079
13.375	72.0	12.347	0.514	14.375	....	20.768	....	5.640	....	....	....	1650	....	1798	1893	2221
14.000	82.5	12.876	0.562	15.000	....	23.726	....	5.640	....	....	....	1872	....	2043	2152	2523

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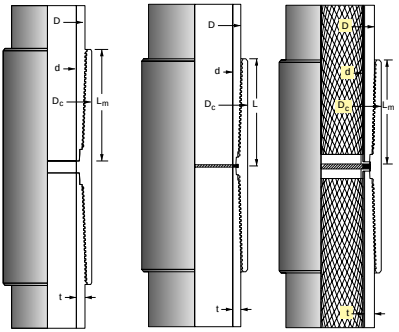
C-90	C/T-95	P-110	Q-125	MW-100SS	MW-110SS	MW-140	MW-150	MW-155
465	488	581	627	511	558	697	744	767
920	966	1151	1243	1013	1105	1381	1473	1519
920	966	1151	1243	1013	1105	1381	1473	1519
1471	1544	1838	1986	1537	1677	2206	2353	2427
1730	1817	2163	2336	1903	2076	2595	2769	2855
1597	1676	1996	2155	1756	1916	2395	2554	2634

C-90	C/T-95	P-110	Q-125	MW-100SS	MW-110SS	MW-140	MW-150	MW-155
212	1273	1516	1637	1334	1455	1819	1940	2001
1654	1736	2067	2233	1819	1985	2481	2646	2729
1777	1866	2222	2399	1955	2133	2666	2844	2932
1848	1940	2310	2494	2033	2217	2772	2956	3049
1973	2072	2466	2663	2170	2368	2959	3157	3255



NS-CC NS-CC-K1 NS-CC-FGL

Q-125	L-80	NT-80SS	NT-85SS	C-90	NT-90HSS	NT-90SS	C-95	NT-95HS	NT-95HSS	NT-95SS	P-110	NT-110HSS	NT-110SS	Q-125	NT-125DS	NT-150DS
548	379	379	393	404	404	404	424	441	424	424	503	486	486	548	564	651
661	457	457	474	487	487	487	512	532	512	512	606	586	586	661	681	785
724	510	510	526	537	537	537	563	590	563	563	671	644	644	724	751	858
724	510	510	526	537	537	537	563	590	563	563	671	644	644	724	751	858
724	510	510	526	537	537	537	563	590	563	563	671	644	644	724	751	858
620	428	428	444	456	456	456	480	498	480	480	568	550	550	620	638	736
728	503	503	521	536	536	536	563	585	563	563	667	646	646	728	749	865
782	550	550	568	579	579	579	608	637	608	608	724	695	695	782	811	927
782	550	550	568	579	579	579	608	637	608	608	724	695	695	782	811	927
782	550	550	568	579	579	579	608	637	608	608	724	695	695	782	811	927
860	592	592	614	633	633	633	665	689	665	665	786	763	763	860	884	1023
1008	693	693	720	742	742	742	780	808	780	780	922	894	894	1008	1036	1199
1138	783	783	813	837	837	837	880	911	880	880	1040	1009	1009	1138	1169	1353
823	565	565	587	605	605	605	636	659	636	636	752	730	730	823	846	979
934	641	641	666	687	687	687	722	747	722	722	853	828	828	934	959	1110
1045	718	718	746	768	768	768	808	836	808	808	955	926	926	1045	1073	1243
1152	791	791	822	847	847	847	891	922	891	891	1053	1022	1022	1152	1184	1370
1183	833	833	859	876	876	876	920	964	920	920	1096	1052	1052	1183	1227	1402
1183	833	833	859	876	876	876	920	964	920	920	1096	1052	1052	1183	1227	1402
1183	833	833	859	876	876	876	920	964	920	920	1096	1052	1052	1183	1227	1402
1183	833	833	859	876	876	876	920	964	920	920	1096	1052	1052	1183	1227	1402
1183	833	833	859	876	876	876	920	964	920	920	1096	1052	1052	1183	1227	1402
926	635	635	660	681	681	681	716	740	716	716	845	821	821	926	951	1102
1052	721	721	750	773	773	773	813	841	813	813	960	933	933	1052	1080	1252
1197	820	820	853	880	880	880	925	957	925	925	1093	1061	1061	1197	1229	1424
1379	945	945	982	1013	1013	1013	1065	1101	1065	1065	1258	1222	1222	1379	1415	1640
1536	1053	1053	1095	1129	1129	1129	1187	1227	1187	1187	1402	1362	1362	1536	1577	1827
1619	1109	1109	1154	1189	1189	1189	1251	1293	1251	1251	1477	1435	1435	1619	1661	1926
1672	1160	1160	1206	1238	1238	1238	1300	1353	1300	1300	1545	1486	1486	1672	1734	1981
1265	864	864	899	928	928	928	976	1008	976	976	1152	1121	1121	1265	1296	1506
1415	966	966	1005	1038	1038	1038	1092	1127	1092	1092	1288	1253	1253	1415	1450	1683
1562	1066	1066	1110	1146	1146	1146	1206	1244	1206	1206	1423	1384	1384	1562	1601	1859
1728	1180	1180	1228	1268	1268	1268	1334	1377	1334	1334	1574	1531	1531	1728	1771	2056
1837	1254	1254	1306	1348	1348	1348	1418	1464	1418	1418	1673	1628	1628	1837	1883	2186
1393	947	947	987	1021	1021	1021	1074	1106	1074	1074	1266	1233	1233	1393	1425	1658
1527	1038	1038	1082	1119	1119	1119	1178	1213	1178	1178	1388	1352	1352	1527	1563	1818
1650	1122	1122	1170	1210	1210	1210	1273	1311	1273	1273	1500	1461	1461	1650	1689	1965
1890	1285	1285	1340	1386	1386	1386	1458	1502	1458	1458	1718	1674	1674	1890	1934	2251
2052	1396	1396	1455	1504	1504	1504	1583	1630	1583	1583	1865	1818	1818	2052	2100	2444
2098	1426	1426	1487	1538	1538	1538	1618	1666	1618	1618	1906	1858	1858	2098	2146	2498
2205	1498	1498	1562	1616	1616	1616	1700	1750	1700	1700	2003	1952	1952	2205	2255	2626
2378	1616	1616	1685	1743	1743	1743	1834	1888	1834	1834	2160	2106	2106	2378	2433	2832
2431	1664	1664	1735	1795	1795	1795	1888	1944	1888	1888	2225	2161	2161	2431	2505	2881
1570	1063	1063	1109	1149	1149	1149	1209	1243	1209	1209	1423	1390	1390	1570	1604	1870
1758	1190	1190	1242	1287	1287	1287	1354	1392	1354	1354	1594	1556	1556	1758	1795	2094
1925	1303	1303	1360	1409	1409	1409	1483	1524	1483	1483	1745	1704	1704	1925	1966	2293
2109	1428	1428	1490	1544	1544	1544	1625	1670	1625	1625	1912	1867	1867	2109	2154	2513
2291	1551	1551	1619	1677	1677	1677	1765	1814	1765	1765	2077	2028	2028	2291	2340	2730
2777	1954	1954	2016	2057	2057	2057	2160	2263	2160	2160	2571	2468	2468	2777	2880	3291
1607	1084	1084	1132	1175	1175	1175	1237	1269	1237	1237	1454	1422	1422	1607	1639	1915
1854	1250	1250	1307	1356	1356	1356	1427	1464	1427	1427	1677	1640	1640	1854	1891	2210
2074	1399	1399	1462	1517	1517	1517	1596	1638	1596	1596	1877	1835	1835	2074	2116	2473
2256	1521	1521	1590	1650	1650	1650	1736	1781	1736	1736	2041	1996	1996	2256	2301	2689
2752	1854	1854	1938	2012	2012	2012	2117	2171	2117	2117	2488	2435	2435	2752	2806	3281
1840	1233	1233	1291	1343	1343	1343	1414	1446	1414	1414	1659	....	....	1840	1872	2195
2074	1389	1389	1455	1514	1514	1514	1594	1630	1594	1594	1870	....	....	2074	2110	2474
2306	1545	1545	1618	1683	1683	1683	1772	1812	1772	1772	2079	....	....	2306	2346	2752
2463	1650	1650	1728	1798	1798	1798	1893	1935	1893	1893	2221	....	....	2463	2506	2939
2802	1872	1872	1962	2043	2043	2043	2152	2198	2152	2152	2523	....	....	2802	2848	3344

NIPPON STEEL CORP. NS-CC is a field-proven, high-performance threaded and coupled connection. It combines the rugged buttress thread form with a patented two-step pin nose and high pressure gas-tight metal-to-metal seal. It provides API Buttress Joint Strength on API casing sizes and weights while maintaining low hoop stress in the coupling for H2S environments. Recess free bore allows for less turbulent flow. Excellent anti-gall performance for carbon and high-chrome materials is demonstrated in API 5C5 testing and in the field. NS-CC has full interchange ability in size range.

NIPPON STEEL CORP NS-CC-K1 (Single Ring K) for internally coated pipe combines the field proven, high-performance threaded and coupled NS-CC connection without the need to coat the coupling ID. Combination of the high-performance connection and internally plastic coated pipe makes this product suitable for injection and production applications where corrosion is a major consideration. A "holiday free" connection with a positive torque stoop prevents over compression or looping of the ring during assembly. The ring is replaceable in the field without breaking out the mill end of the coupling.

NIPPON STEEL CORP NS-CC-FGL (Fiber Glass Lined) combines field proven, high-performance threaded and coupled NS-CC connection with the Rice Engineering Duoline products. Combination of the high-performance connection and fiberglass liner make this product suitable for injection and production applications where corrosion is a major consideration. A "holiday free" connection with a positive torque stop prevents over compression or looping of the ring during assembly. Ring is replaceable in the field without breaking out the mill end of the coupling.

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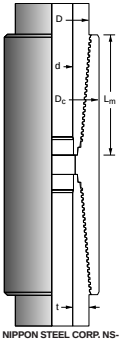
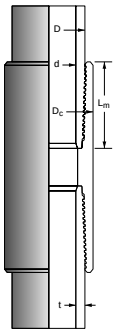


NIPPON STEEL CORP. NS-HC for heavier weight casing provides high-joint strength in thick wall casing while maintaining low hoop stress in the coupling. Recess-free bore allows less turbulent flow. Excellent anti-gall performance has been demonstrated in API 5CS tests.

Nippon Steel Corp.—NS-HC

Type: Threaded, coupled Seal: Metal-to-metal

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110
5.500	30.9	4.330	0.585	6.054	....	9.033	....	5.300	....	....	....	815	....	858	901	1073
5.500	31.4	4.308	0.596	6.054	....	9.182	....	5.300	....	....	....	829	....	873	917	1091
5.500	32.0	4.276	0.612	6.054	....	9.398	....	5.300	....	....	....	850	....	895	939	1118
6.625	41.4	5.346	0.640	7.390	....	12.034	....	5.590	....	....	....	1092	....	1149	1206	1436
6.625	43.7	5.251	0.687	7.390	....	12.816	....	5.590	....	....	....	1166	....	1227	1289	1534
6.625	46.7	5.154	0.736	7.390	....	13.617	....	5.590	....	....	....	1242	....	1307	1373	1634
7.000	44.9	5.685	0.657	7.700	....	13.092	....	5.800	....	....	....	1189	....	1252	1314	1565
7.000	45.4	5.660	0.670	7.700	....	13.324	....	5.800	....	....	....	1211	....	1275	1339	1594
7.000	46.4	5.626	0.687	7.700	....	13.625	....	5.800	....	....	....	1240	....	1305	1370	1631
7.000	49.5	5.540	0.730	7.700	....	14.379	....	5.800	....	....	....	1311	....	1380	1449	1726
7.000	50.1	5.500	0.750	7.700	....	14.726	....	5.800	....	....	....	1344	....	1415	1486	1769
7.000	51.8	5.447	0.776	7.700	....	15.173	....	5.800	....	....	....	1383	....	1456	1528	1820
7.625	51.2	6.251	0.687	8.500	....	14.974	....	6.050	....	....	....	1363	....	1435	1507	1793
7.625	52.8	6.201	0.712	8.500	....	15.463	....	6.050	....	....	....	1410	....	1484	1558	1855
7.625	55.3	6.125	0.750	8.500	....	16.199	....	6.050	....	....	....	1479	....	1557	1635	1947
7.625	59.2	6.001	0.812	8.500	....	17.380	....	6.050	....	....	....	1592	....	1675	1759	2094
7.625	63.2	5.875	0.875	8.500	....	18.555	....	6.050	....	....	....	1703	....	1793	1883	2241
7.625	64.2	5.856	0.885	8.500	....	18.739	....	6.050	....	....	....	1721	....	1811	1902	2264
8.625	58.7	7.251	0.687	9.625	....	17.132	....	6.070	....	....	....	1560	....	1642	1724	2053
8.625	63.5	7.125	0.750	9.625	....	18.555	....	6.070	....	....	....	1695	....	1785	1874	2231
8.625	68.1	7.001	0.812	9.625	....	19.931	....	6.070	....	....	....	1826	....	1922	2018	2403
8.625	72.7	6.875	0.875	9.625	....	21.304	....	6.070	....	....	....	1957	....	2060	2163	2574
8.625	77.1	6.751	0.937	9.625	....	22.631	....	6.070	....	....	....	2083	....	2192	2302	2740
9.625	66.1	8.269	0.678	10.625	....	19.057	....	6.080	....	....	....	1735	....	1827	1918	2283
9.625	70.3	8.157	0.734	10.625	....	20.502	....	6.080	....	....	....	1873	....	1971	2070	2464
9.625	71.8	8.125	0.750	10.625	....	20.911	....	6.080	....	....	....	1911	....	2012	2113	2515
9.625	75.6	8.031	0.797	10.625	....	22.104	....	6.080	....	....	....	2025	....	2131	2238	2664
9.625	80.8	7.907	0.859	10.625	....	23.656	....	6.080	....	....	....	2172	....	2287	2401	2858
9.625	84.0	7.844	0.891	10.625	....	24.448	....	6.080	....	....	....	2247	....	2366	2484	2957
10.750	79.2	9.282	0.734	11.825	....	23.096	....	6.080	....	....	....	2110	....	2221	2332	2777
10.750	80.8	9.250	0.750	11.825	....	23.562	....	6.080	....	....	....	2154	....	2268	2381	2835
10.750	85.3	9.156	0.797	11.825	....	24.921	....	6.080	....	....	....	2284	....	2404	2524	3005
10.750	91.2	9.032	0.859	11.825	....	26.692	....	6.080	....	....	....	2452	....	2581	2710	3226
10.750	97.1	8.906	0.922	11.825	....	28.467	....	6.080	....	....	....	2620	....	2758	2896	3448
10.750	102.9	8.782	0.984	11.825	....	30.190	....	6.080	....	....	....	2784	....	2931	3077	3663
10.750	108.7	8.656	1.047	11.825	....	31.916	....	6.080	....	....	....	2842	....	2991	3141	3739



NKK CORP. NK 3SB has high strength for eliminating jump-out failure. With metal-to-metal spheroid type and metal-to-metal internal shoulder seals, external or internal pressures sufficient to collapse or burst casing or tubing will not disrupt leak resistance. Stabbing design virtually eliminates cross threading. Electro-zinc plated for repeatable make-up.

NKK Corp.—NK 3SB

Type: Coupled Seal: Metal-to-metal

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
6.625	24.0	5.921	0.352	7.390	7.169	6.937	9.607	5.020	....	477	577	623	648	666	700	828	905
6.625	28.0	5.791	0.417	7.390	7.276	8.133	9.607	5.020	....	559	677	730	759	781	821	971	1061
6.625	32.0	5.675	0.475	7.390	7.276	9.177	9.607	5.020	....	631	764	824	857	881	826	1095	1198
7.000	23.0	6.366	0.317	7.656	7.469	6.656	9.010	5.295	....	455	549	595	619	637	670	792	867
7.000	26.0	6.276	0.362	7.656	7.547	7.549	9.010	5.295	....	516	623	675	702	723	760	898	983
7.000	29.0	6.184	0.408	7.656	7.547	8.449	9.010	5.295	....	577	697	755	785	809	850	1005	1100
7.000	32.0	6.094	0.453	7.772	7.656	9.317	10.416	5.295	....	637	769	833	866	892	938	1108	1213
7.000	35.0	6.004	0.498	7.772	7.656	10.172	10.416	5.295	....	695	839	910	946	974	1024	1210	1324
7.000	38.0	5.920	0.540	7.886	7.656	10.959	11.818	5.295	....	749	904	980	1019	1049	1103	1304	1427
7.000	41.0	5.820	0.590	7.886	7.656	11.881	11.818	5.295	....	812	980	1062	1104	1137	1196	1413	1547
7.625	26.4	6.969	0.328	8.500	8.125	7.519	12.661	5.295	....	509	611	668	694	716	753	890	975
7.625	29.7	6.875	0.375	8.500	8.201	8.541	12.661	5.295	....	578	694	759	788	814	856	1011	1108
7.625	33.7	6.765	0.430	8.500	8.291	9.720	12.661	5.295	....	658	790	864	897	926	974	1150	1260
7.625	39.0	6.625	0.500	8.500	8.409	11.192	12.661	5.295	....	757	910	994	1033	1066	1121	1324	1451
7.625	42.8	6.501	0.562	8.500	8.409	12.470	12.661	5.295	....	844	1014	1108	1150	1188	1249	1476	1617
7.625	47.1	6.375	0.625	8.626	8.500	13.745	14.355	5.295	....	930	1117	1221	1268	1310	1377	1627	1782
8.625	32.0	7.921	0.352	9.625	9.165	9.149	16.135	5.311	....	610	726	805	934	865	910	1073	1179
8.625	36.0	7.825	0.400	9.625	9.248	10.336	16.135	5.311	....	689	821	909	942	977	1028	1213	1332
8.625	40.0	7.725	0.450	9.625	9.335	11.557	16.135	5.311	....	770	918	1016	1053	1093	1149	1356	1489
8.625	44.0	7.625	0.500	9.625	9.417	12.763	16.135	5.311	....	851	1013	1122	1163	1207	1269	1498	1644
8.625	49.0	7.511	0.557	9.625	9.512	14.118	16.135	5.311	....	941	1121	1242	1287	1335	1404	1657	1819
8.625	52.0	7.435	0.595	9.625	9.512	15.010	16.135	5.311	....	1000	1192	1320	1368	1419	1493	1761	1934
9.625	36.0	8.921	0.352	10.625	10.157	10.254	18.095	5.508	....	673	795	892	923	962	1012	1193	1312
9.625	40.0	8.835	0.395	10.625	10.232	11.454	18.095	5.508	....	751	888	997	1031	1075	1131	1332	1466
9.625	43.5	8.755	0.435	10.625	10.303	12.559	18.095	5.508	....	824	973	1093	1130	1178	1240	1461	1608
9.625	47.0	8.681	0.472	10.625	10.370	13.572	18.095	5.508	....	890	1052	1181	1222	1273	1340	1579	1737
9.625	53.5	8.535	0.545	10.625	10.370	15.547	18.095	5.508	....	1020	1205	1353	1399	1459	1535	1809	1990
9.625	58.4	8.435	0.595	10.625	10.370	16.879	18.095	5.508	....	1107	1308	1469	1519	1584	1666	1964	2160
9.625	61.1	8.375	0.625	10.625	10.370	17.672	18.095	5.508	....	1159	1370	1538	1591	1658	1744	2056	2262
10.750	40.5	10.050	0.350	11.750	11.283	11.435	20.103	5.508	....	737	862	984	1015	1064	1119	1317	1453
10.750	45.5	9.950	0.400	11.750	11.374	13.006	20.103	5.508	....	838	980	1119	1154	1210	1273	1498	1652
10.750	51.0	9.850	0.454	11.750	11.465	14.561	20.103	5.508	....	938	1098	1253	1292	1354	1425	1677	1850
10.750	55.5	9.760	0.495	11.750	11.543	15.947	20.103	5.508	....	1028	1202	1372	1415	1483	1561	1837	2026
10.750	60.7	9.660	0.545	11.750	11.630	17.473	20.103	5.508	....	1126	1317	1503	1551	1625	1710	2013	2220
10.750	65.7	9.560	0.595	11.750	11.630	18.982	20.103	5.508	....	1223	1431	1633	1685	1766	1858	2187	2412
10.750	71.1	9.450	0.650	11.750	11.630	20.625	20.103	5.508	....	1329	1555	1774	1831	1918	2019	2376	2620
10.750	73.2	9.400	0.672	11.750	11.630	21.276	20.103	5.508	....	1371	1604	1830	1888	1979	2082	2451	2703
11.750	47.0	11.000	0.375	12.750	12.331	13.401	21.902	5.508	....	850	985	1141	1174	1237	1302	1530	1691
11.750	54.0	10.880	0.435	12.750	12.441	15.463	21.902	5.508	....	980	1136	1316	1355	1427	1502	1766	1952
11.750	60.0	10.772	0.489	12.750	12.539	17.300	21.902	5.508	....	1097	1271	1472	1516	1597	1680	1976	2183
13.375	54.5	12.615	0.380	14.375	13.969	15.514	24.887	5.508	....	957	1092	1298	1331	1413	1488	1746	1937
13.375	61.0	12.515	0.430	14.375	14.059	17.487	24.887	5.508	....	1079	1231	1463	1501	1593	1677	1968	2183
13.375	68.0	12.415	0.480	14.375	14.150	19.445	24.887	5.508	....	1200	1369	1626	1669	1772	1865	2189	2428
13.375	72.0	12.347	0.514	14.375	14.213	20.768	24.887	5.508	....	1282	1462	1737	1782	1892	1992	2338	2593

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Q-125	L-80	NT-80SS	NT-85SS	C-90	NT-90HSS	NT-90SS	C-95	NT-95HS	NT-95HSS	NT-95SS	P-110	NT-110HSS	NT-110SS	Q-125	NT-125DS	NT-150DS
1159	815	815	841	858	858	858	901	944	901	901	1073	1030	1030	1159	1201	1373
1179	829	829	856	873	873	873	917	960	917	917	1091	1048	1048	1179	1222	1397
1208	850	850	877	895	895	895	939	984	939	939	1118	1074	1074	1208	1253	1431
1551	1092	1092	1126	1149	1149	1149	1206	1264	1206	1206	1436	1379	1379	1551	1609	1838
1657	1166	1166	1203	1227	1227	1227	1289	1350	1289	1289	1534	1473	1473	1657	1718	1964
1765	1242	1242	1281	1307	1307	1307	1373	1438	1373	1373	1634	1569	1569	1765	1830	2092
1690	1189	1189	1227	1252	1252	1252	1314	1377	1314	1314	1565	1502	1502	1690	1752	2003
1721	1211	1211	1249	1275	1275	1275	1339	1402	1339	1339	1594	1530	1530	1721	1785	2040
1762	1240	1240	1279	1305	1305	1305	1370	1436	1370	1370	1631	1566	1566	1762	1827	2088
1864	1311	1311	1353	1380	1380	1380	1449	1519	1449	1449	1726	1657	1657	1864	1933	2209
1910	1344	1344	1387	1415	1415	1415	1486	1557	1486	1486	1769	1698	1698	1910	1981	2264
1965	1383	1383	1426	1456	1456	1456	1528	1601	1528	1528	1820	1747	1747	1965	2038	2329
1937	1363	1363	1406	1435	1435	1435	1507	1578	1507	1507	1793	1722	1722	1937	2009	2296
2003	1410	1410	1454	1484	1484	1484	1558	1632	1558	1558	1855	1780	1780	2003	2077	2374
2102	1479	1479	1526	1557	1557	1557	1635	1713	1635	1635	1947	1869	1869	2102	2180	2492
2262	1592	1592	1642	1675	1675	1675	1759	1843	1759	1759	2094	2010	2010	2262	2345	2681
2420	1703	1703	1757	1793	1793	1793	1883	1972	1883	1883	2241	2151	2151	2420	2510	2869
2445	1721	1721	1775	1811	1811	1811	1902	1992	1902	1902	2264	2174	2174	2445	2536	2898
2217	1560	1560	1610	1642	1642	1642	1724	1807	1724	1724	2053	1971	1971	2217	2299	2628
2409	1695	1695	1749	1785	1785	1785	1874	1963	1874	1874	2231	2142	2142	2409	2498	2855
2595	1826	1826	1884	1922	1922	1922	2018	2114	2018	2018	2403	2307	2307	2595	2691	3076
2780	1957	1957	2018	2060	2060	2060	2163	2265	2163	2163	2574	2471	2471	2780	2883	3295
2960	2083	2083	2148	2192	2192	2192	2302	2411	2302	2302	2740	2631	2631	2960	3069	3508
2466	1735	1735	1790	1827	1827	1827	1918	2009	1918	1918	2283	2192	2192	2466	2557	2923
2661	1873	1873	1932	1971	1971	1971	2070	2168	2070	2070	2464	2365	2365	2661	2760	3154
2716	1911	1911	1972	2012	2012	2012	2113	2213	2113	2113	2515	2414	2414	2716	2817	3219
2877	2025	2025	2089	2131	2131	2131	2238	2344	2238	2238	2664	2558	2558	2877	2984	3410
3087	2172	2172	2241	2287	2287	2287	2401	2515	2401	2401	2858	2744	2744	3087	3201	3658
3194	2247	2247	2318	2366	2366	2366	2484	2602	2484	2484	2957	2839	2839	3194	3312	3785
2999	2110	2110	2177	2221	2221	2221	2332	2443	2332	2332	2777	2665	2665	2999	3110	3554
3062	2154	2154	2222	2268	2268	2268	2381	2495	2381	2381	2835	2721	2721	3062	3175	3629
3245	2284	2284	2356	2404	2404	2404	2524	2644	2524	2524	3005	2884	2884	3245	3365	3846
3484	2452	2452	2529	2581	2581	2581	2710	2839	2710	2710	3226	3097	3097	3484	3613	4129
3724	2620	2620	2703	2758	2758	2758	2896	3034	2896	2896	3448	3310	3310	3724	3862	4413
3956	2784	2784	2872	2931	2931	2931	3077	3224	3077	3077	3663	3517	3517	3956	4103	4689
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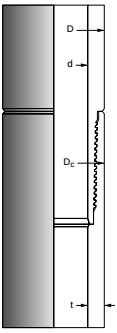
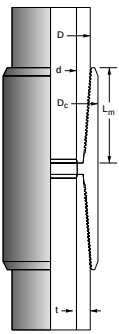


NKK CORP. NK FJ2 flush joint liner for linear and moderate depth casing applications provides high joint strength without jump out and complete flush OD for maximum clearance. Plain end allows unlimited recut and refreading. Hoop stress after make up is minimized due to low thread interference. It is interchangeable with NK FJI.

NKK Corp.—NK FJ2 Liner

Type: Flush **Seal: Metal-to-metal**

										Minimum joint tension strength, kips							
D	w	d	t	D_c	D_{sc}	A_t	A_s	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
6.625	28.0	5.791	0.417	6.625	....	8.133	3.939	3.457	....	295	374	394	394	406	414	492	532
6.625	32.0	5.675	0.475	6.625	....	9.177	3.939	3.457	....	295	374	394	394	406	414	492	532
7.000	26.0	6.276	0.362	7.000	....	7.549	4.408	3.457	....	310	385	405	405	417	425	506	546
7.000	29.0	6.184	0.408	7.000	....	8.449	4.138	3.457	....	310	393	414	414	426	434	517	559
7.000	32.0	6.094	0.453	7.000	....	9.317	4.138	3.457	....	368	393	414	414	426	434	517	559
7.000	35.0	6.004	0.498	7.000	....	10.172	4.912	3.457	....	368	467	491	491	506	516	614	663
7.000	38.0	5.920	0.540	7.000	....	10.959	4.912	3.457	....	368	467	491	491	506	516	614	663
7.000	41.0	5.820	0.590	7.000	....	11.881	4.912	3.457	....	368	467	491	491	506	516	614	663
7.625	29.7	6.875	0.375	7.625	....	8.541	4.571	3.457	....	343	434	457	457	471	480	571	617
7.625	33.7	6.765	0.430	7.625	....	9.720	4.665	3.457	....	350	443	467	467	480	490	583	630
7.625	35.8	6.695	0.465	7.625	....	10.460	4.665	3.457	....	350	443	467	467	480	490	583	630
7.625	39.0	6.625	0.500	7.625	....	11.192	5.118	3.457	....	384	486	512	512	527	537	640	691
7.625	42.8	6.501	0.562	7.625	....	12.470	5.118	3.457	....	384	486	512	512	527	537	640	691
7.750	46.1	6.560	0.595	7.750	....	13.374	6.627	3.457	....	497	630	663	663	683	696	828	895
7.750	48.6	6.470	0.640	7.750	....	14.296	6.627	3.457	....	497	630	663	663	683	696	828	895



NKK CORP. NK HW heavy-wall casing has high-joint strength equivalent to pipe body strength; two metal-to-metal seals that provide positive leak resistance and a precision-machined negative angle load flank connection to minimize hoop stress generation. Initial misalignments are corrected by flat-crested threads parallel to pipe axis. Turbulence is minimized by smooth ID connection to pipe body ID.

NKK Corp.—NK HW

Type: Coupled **Seal: Metal-to-metal**

									Minimum joint tension strength, kips							
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
6.625	34.5	5.450	0.525	7.232	6.988	10.061	10.780	5.684	....	....	....	903	939	988	1015	1201	1313
6.625	36.7	5.376	0.562	7.291	7.035	10.705	11.453	5.684	....	....	....	961	1000	1051	1080	1278	1397
6.625	40.2	5.250	0.625	7.394	7.110	11.781	12.641	5.684	....	....	....	1057	1100	1157	1189	1406	1538
6.625	43.7	5.126	0.687	7.504	7.185	12.816	13.928	5.684	....	....	....	1150	1197	1258	1294	1529	1673
6.625	46.0	5.040	0.730	7.579	7.236	13.519	14.816	5.684	....	....	....	1213	1262	1327	1364	1613	1764
6.625	47.1	5.000	0.750	7.614	7.256	13.843	15.234	5.684	....	....	....	1242	1293	1359	1397	1652	1807
6.625	50.4	4.876	0.812	7.720	7.327	14.829	16.511	5.684	....	....	....	1331	1385	1456	1497	1770	1935
7.000	38.0	5.920	0.540	7.634	7.382	10.959	11.735	5.702	....	....	....	980	1019	1072	1103	1304	1427
7.000	41.0	5.820	0.590	7.717	7.445	11.881	12.736	5.702	....	....	....	1062	1104	1163	1196	1413	1547
7.000	42.7	5.750	0.625	7.772	7.488	12.517	13.405	5.702	....	....	....	1119	1164	1225	1260	1489	1630
7.000	44.0	5.720	0.640	7.799	7.508	12.788	13.735	5.702	....	....	....	1143	1189	1251	1287	1251	1665
7.000	46.0	5.660	0.670	7.850	7.543	13.324	14.362	5.702	....	....	....	1191	1239	1304	1341	1585	1735
7.000	46.4	5.626	0.687	7.878	7.563	13.625	14.708	5.702	....	....	....	1218	1267	1333	1371	1621	1774
7.000	49.5	5.540	0.730	7.957	7.614	14.379	15.691	5.702	....	....	....	1286	1337	1407	1447	1711	1872
7.000	50.1	5.500	0.750	7.992	7.638	14.726	16.129	5.702	....	....	....	1317	1369	1441	1482	1752	1917
7.000	53.6	5.376	0.812	8.098	7.709	15.785	17.469	5.702	....	....	....	1411	1467	1545	1589	1878	2055
7.000	57.1	5.250	0.875	8.213	7.780	16.837	18.942	5.702	....	....	....	1506	1565	1348	1695	2003	2192
7.625	42.8	6.501	0.562	8.303	8.043	12.470	13.328	5.732	....	....	....	1108	1150	1214	1249	1476	1617
7.625	45.3	6.435	0.595	8.358	8.083	13.141	14.048	5.732	....	....	....	1168	1212	1279	1317	1555	1704
7.625	47.1	6.735	0.625	8.409	8.122	13.745	14.720	5.732	....	....	....	1221	1268	1338	1377	1627	1782
7.625	51.2	6.251	0.687	8.512	8.197	14.974	16.088	5.732	....	....	....	1330	1381	1457	1500	1772	1942
7.625	52.8	6.201	0.712	8.559	8.228	15.463	16.719	5.732	....	....	....	1374	1427	1505	1549	1830	2005
7.625	55.3	6.125	0.750	8.625	8.276	16.199	17.609	5.732	....	....	....	1439	1494	1576	1623	1917	2101
7.625	59.2	6.001	0.812	8.736	8.346	17.380	19.123	5.732	....	....	....	1544	1603	1691	1741	2057	2254
8.625	49.0	7.511	0.557	9.307	9.043	14.118	15.131	5.780	....	....	....	1242	1287	1362	1404	1657	1819

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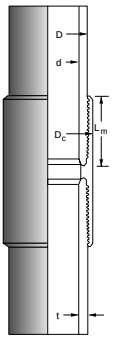
NKK Corp.—NK HW (continued)

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{pc}	A_s	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
8.625	49.1	7.501	0.562	9.315	9.047	14.236	15.248	5.780	....	....	....	1252	1297	1373	1416	1670	1834
8.625	52.0	7.435	0.595	9.370	9.091	15.010	16.055	5.780	....	....	....	1320	1368	1448	1493	1761	1934
8.625	54.0	7.375	0.625	9.421	9.130	15.708	16.808	5.780	....	....	....	1381	1432	1515	1562	1843	2024
8.625	58.7	7.251	0.687	9.524	9.209	17.132	18.340	5.780	....	....	....	1507	1561	1653	1704	2010	2207
8.625	63.5	7.125	0.750	9.634	9.287	18.555	19.996	5.780	....	....	....	1632	1691	1790	1845	2177	2391
8.625	68.1	7.001	0.812	9.744	9.362	19.931	21.670	5.780	....	....	....	1753	1816	1923	1982	2339	2568
9.625	58.4	8.435	0.595	10.358	10.075	16.879	18.048	6.028	....	....	....	1469	1519	1614	1666	1964	2160
9.625	59.4	8.407	0.609	10.382	10.094	17.250	18.439	6.028	....	....	....	1501	1553	1649	1703	2007	2208
9.625	61.1	8.375	0.625	10.413	10.114	17.672	18.945	6.028	....	....	....	1538	1591	1690	1744	2056	2262
9.625	54.9	8.281	0.672	10.492	10.177	18.901	20.242	6.028	....	....	....	1645	1701	1807	1866	2199	2419
9.625	70.3	8.157	0.734	10.594	10.256	20.502	21.931	6.028	....	....	....	1784	1845	1960	2024	2385	2624
9.625	75.6	8.031	0.797	10.705	10.335	22.104	23.788	6.028	....	....	....	1924	1990	2113	2182	2571	2829
9.625	80.8	7.907	0.859	10.815	10.413	23.656	25.647	6.028	....	....	....	2059	2129	2262	2335	2752	3028
10.750	65.7	9.560	0.595	11.492	11.205	18.982	20.337	6.082	....	....	....	1633	1685	1797	1858	2187	2412
10.750	73.2	9.406	0.672	11.626	11.307	21.276	22.770	6.082	....	....	....	1830	1888	2014	2082	2451	2703
10.750	79.2	9.282	0.734	11.732	11.390	23.096	24.715	6.082	....	....	....	1987	2050	2186	2260	2661	2934
10.750	85.3	9.156	0.797	11.839	11.469	24.921	26.695	6.082	....	....	....	2144	2212	2359	2439	2871	3166
10.750	91.2	9.032	0.859	11.949	11.547	26.692	28.750	6.082	....	....	....	2296	2369	2526	2612	3075	3391
14.000	86.0	12.800	0.600	14.771	14.472	25.258	27.031	6.238	....	....	....	2098	2150	2321	2411	2827	3140
14.000	93.0	12.700	0.650	16.863	14.543	27.261	29.173	6.238	....	....	....	2265	2320	2505	2602	3051	3389
14.000	100.0	12.600	0.700	14.953	14.614	29.248	31.280	6.238	....	....	....	2430	2489	2687	2792	3274	3636
14.000	107.0	12.500	0.750	15.043	14.681	31.220	33.400	6.238	....	....	....	2594	2657	2868	2980	3495	3881
14.000	113.0	12.400	0.800	15.130	14.752	33.175	35.462	6.238	....	....	....	2756	2824	3048	3167	3713	4124
14.000	120.0	12.300	0.850	15.220	14.819	35.115	37.608	6.238	....	....	....	2917	2989	3226	3352	3930	4366



SIDERCA SEC-ST is a premium, non-upset coupled connection designed to resist jump-outs and reduce chance of crosshreading. Full thread run-out ensures 100% tensile efficiency. Wide stop shoulder prevents over torquing and seal damage under extreme service conditions. OD is smaller than equivalent API connections. Where space is critical, special clearances are available. In addition to above SEC-ST benefits and features, **SEC-FR** has a better performance under sour environment (less joint tension strains through a longer coupling with same make-up loss), and **SEC-GR** is specially designed for CRA materials used for sweet severe corrosion conditions.

Siderca S.A.I.C.—SEC-ST, FR & GR

Type: Coupled, non-upset **Seal: Metal-to-metal**

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{pc}	A_s	A_c *	L_m	H-40 *	J-55 *	K-55 *	L-80 *	N-80 *	C-90 *	C/T-95 *	P-110 *	Q-125 *
5.000	13.0	4.369	0.253	5.437	0.000	3.771	4.245	4.76	151	207	207	302	302	339	358	415	471
5.000	15.0	4.283	0.296	5.563	5.390	4.374	5.343	4.76	175	241	241	350	350	394	416	481	547
5.000	18.0	4.151	0.362	5.563	5.390	5.275	5.343	4.76	211	290	290	422	422	475	501	580	659
5.000	20.8	4.031	0.422	5.768	5.390	6.070	7.166	4.76	243	334	334	486	486	546	577	668	759
5.000	21.4	4.001	0.437	5.768	5.390	6.265	7.166	4.76	251	345	345	501	501	564	595	689	783
5.000	24.1	3.875	0.500	5.768	5.563	7.068	7.166	4.76	283	389	389	565	565	636	671	777	884
5.500	15.5	4.825	0.275	6.051	5.890	4.511	5.968	4.84	180	248	248	361	361	406	428	496	564
5.500	17.0	4.767	0.304	6.051	5.890	4.960	5.968	4.84	198	273	273	397	397	446	471	546	620
5.500	20.0	4.653	0.361	6.051	5.890	5.858	5.968	4.84	233	321	321	466	466	525	554	641	729
5.500	23.0	4.545	0.415	6.220	5.890	6.626	7.595	4.84	265	364	364	530	530	596	629	729	828
5.500	26.8	4.423	0.476	6.220	5.890	7.510	7.595	4.84	300	413	413	601	601	676	713	826	939
6.625	20.0	5.924	0.288	7.264	7.016	5.733	8.151	5.04	229	315	315	459	459	516	545	631	717
6.625	24.0	5.796	0.352	7.264	7.016	6.936	8.151	5.04	277	381	381	555	555	624	659	763	867
6.625	28.0	5.666	0.417	7.264	7.016	8.133	8.151	5.04	325	447	447	651	651	732	773	895	1017
6.625	32.0	5.550	0.475	7.461	7.165	9.178	10.428	5.04	367	505	505	734	734	826	872	1010	1147
6.625	35.8	5.450	0.525	7.461	7.165	10.063	10.428	5.04	403	553	553	805	805	906	956	1107	1258
7.000	23.0	6.241	0.317	7.657	7.390	6.656	8.833	5.24	266	366	366	532	532	599	632	732	832
7.000	26.0	6.151	0.362	7.657	7.390	7.549	8.833	5.24	302	415	415	604	604	679	717	830	944
7.000	29.0	6.059	0.408	7.657	7.390	8.449	8.833	5.24	338	465	465	676	676	760	803	929	1056
7.000	32.0	5.969	0.453	7.776	7.390	9.317	10.264	5.24	373	512	512	745	745	839	885	1025	1165
7.000	35.0	5.879	0.498	7.776	7.657	10.173	10.264	5.24	407	559	559	814	814	916	966	1119	1272
7.000	38.0	5.795	0.540	7.933	7.657	10.959	12.208	5.24	438	603	603	877	877	986	1041	1205	1370
7.000	41.0	5.695	0.590	7.933	7.657	11.881	12.208	5.24	475	653	653	950	950	1069	1129	1307	1485
7.000	44.0	5.595	0.640	7.992	7.657	12.788	12.946	5.24	512	703	703	1023	1023	1151	1215	1407	1598
7.625	26.4	6.844	0.328	8.346	8.110	7.519	10.571	5.43	301	414	414	602	602	677	714	827	940
7.625	29.7	6.750	0.375	8.346	8.110	8.541	10.571	5.43	342	470	470	683	683	769	811	939	1068
7.625	33.7	6.640	0.430	8.346	8.110	9.720	10.571	5.43	389	535	535	778	778	875	923	1069	1215
7.625	35.8	6.570	0.465	8.346	8.110	10.459	10.571	5.43	418	575	575	837	837	941	994	1151	1307
7.625	39.0	6.500	0.500	8.543	8.110	11.193	13.181	5.43	448	616	616	895	895	1007	1063	1231	1399
7.625	42.8	6.376	0.562	8.543	8.346	12.470	13.181	5.43	499	686	686	998	998	1122	1185	1372	1559
7.625	45.3	6.310	0.595	8.543	8.346	13.141	13.181	5.43	526	723	723	1051	1051	1183	1248	1446	1643
8.625	28.0	7.892	0.304	9.252	9.024	7.947	10.622	5.55	318	437	437	636	636	715	755	874	993
8.625	32.0	7.796	0.352	9.252	9.024	9.148	10.622	5.55	366	503	503	732	732	823	869	1006	1144
8.625	36.0	7.700	0.400	9.252	9.024	10.335	10.622	5.55	413	568	568	827	827	930	982	1137	1292
8.625	40.0	7.600	0.450	9.551	9.252	11.557	15.041	5.55	462	636	636	925	925	1040	1098	1271	1445
8.625	44.0	7.500	0.500	9.551	9.252	12.763	15.041	5.55	511	702	702	1021	1021	1149	1212	1404	1595
8.625	49.0	7.386	0.557	9.551	9.252	14.117	15.041	5.55	565	776	776	1129	1129	1271	1341	1553	1765
8.625	52.0	7.310	0.595	9.551	9.252	15.010	15.041	5.55	600	826	826	1201	1201	1351	1426	1651	1876
8.625	54.0	7.265	0.618	9.606	9.252	15.550	15.872	5.55	622	855	855	1244	1244	1399	1477	1710	1944
8.625	56.0	8.765	0.352	10.299	10.079	10.255	12.220	5.55	410	564	564	820	820	923	974	1128	1282
9.625	40.0	8.679	0.395	10.299	10.079	11.455	12.220	5.55	458	630	630	916	916	1031	1088	1260	1432
9.625	43.5	8.599	0.435	10.492	10.079	12.560	15.733	5.55	502	691	691	1005	1005	1130	1193	1382	1570
9.625	47.0	8.525	0.472	10.492	10.079	13.572	15.733	5.55	543	746	746	1086	1086	1221	1289	1493	1696
9.625	53.5	8.379	0.545	10.492	10.236	15.547	15.733	5.55	622	855	855	1244	1244	1399	1477	1710	1943
9.625	58.4	8.279	0.595	10.606	10.236	16.880	17.954	5.55	675	928	928	1350	1350	1519	1604	1857	2110
9.625	59.4	8.251	0.609	10.626	10.236	17.250	17.954	5.55	690	949	949	1380	1380	1552	1639	1897	2156
9.625	64.9	8.125	0.672	10.689	10.236	18.901	17.954	5.55	756	1040	1040	1512	1512	1701	1796	2079	2363
10.750	40.5	9.894	0.350	11.472	11.268	11.468	15.020	5.55	459	631	631	917	917	1032	1090	1262	1434
10.750	45.5	9.794	0.400	11.472	11.268	13.039	15.020	5.55	522	717	717	1043	1043	1173	1239	1434	1630
10.750	51.0	9.694	0.450	11.472	11.268	14.595	15.020	5.55	584	803	803	1168	1168	1314	1387	1605	1824
10.750	55.5	9.604	0.495	11.748	11.268	15.982	20.045	5.55	639	879	879	1279	1279	1438	1518	1758	1998
10.750	60.7	9.504	0.545	11.748	11.268	17.507	20.045	5.55	700	963	963	1401	1401	1576	1663	1926	2188
10.750	65.7	9.404	0.595	11.748	11.268	19.017	20.045	5.55	761	1046	1046	1521	1521	1712	1807	2092	2377
10.750	73.2	9.252	0.672	11.748	11.472	21.282	20.045	5.55	851	1170	1170	1703	1703	1915	2022	2341	2660
10.750	85.3	9.002	0.797	12.008	11.472	24.921	24.893	5.55	997	1371	1371	1994	1994	2243	2367	2741	3115
11.750	42.0	10.928	0.333	12.433	12.185	11.946	15.681	5.55	478	657	657	956	956	1075	1135	1314	1493
11.750	47.0	10.844	0.375	12.433	12.185	13.394	15.681	5.55	536	737	737	1071	1071	1205	1272	1473	1674
11.750	54.0	10.724	0.435	12.433	12.185	15.464	15.681	5.55	619	851	851	1237	1237	1392	1469	1701	1933
11.750	60.0	10.616	0.489	12.756	12.433	17.298	22.067	5.55	692	951	951	1384	1384	1557	1643	1903	2162
11.750	65.0	10.526	0.534	12.756	12.433	18.817	22.067	5.55	753	1035	1035	1505	1505	1694	1788	2070	2352
11.750	71.0	10.430	0.582	12.756	12.433	20.417	22.067	5.55	817	1123	1123	1633	1633	1837	1940	2246	2552
13.375	54.5	12.459	0.380	14.374	0.000	15.511	24.103	5.55	620	853	853	1241	1241	1396	1474	1706	1939
13.375	61.0	12.359	0.430	14.374	0.000	17.484	24.103	5.55	699	962	962	1399	1399	1574	1661	1923	2186
13.375	68.0	12.259	0.480	14.374	0.000	19.442	24.103	5.55	778	1069	1069	1555	1555	1750	1847	2139	2430
13.375	72.0	12.191	0.514	14.374	0.000	20.775	24.103	5.55	831	1143	1143	1662	1662	1870	1974	2285	2597
13.375	77.0	12.274	0.550	14.374	0.000	22.160	24.103	5.55	886	1219	1219	1773	1773	1994	2105	2438	2770
13.375	80.7	12.214	0.580	14.374	0.000	23.310	24.103	5.55	932	1282	1282	1865	1865	2098	2214	2564	2914
13.375	85.0	12.003	0.608	14.374	0.000	24.382	24.103	5.55	975	1341	1341	1951	1951	2194	2316	2682	3048

*Values for regular couplings.

Contact Siderca S.A.I.C. for special clearance couplings.

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Smith Fiberglass Products Inc.—SDT 1010

Type: Threaded & coupled or integral Seal: Threaded

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m
6.9	7.6	6.06	0.42	7.8	....	....	....	3.1

Smith Fiberglass Products Inc.—SDT 1510

Type: Threaded & coupled or integral Seal: Threaded

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m
6.9	9.4	5.84	0.53	8.2	....	....	....	3.1

Star Fiber Glass Systems, Inc.—Advanced Composite Thread

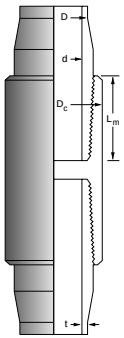
Type: OD 8 Round, Threaded & coupled Seal: Thread lubricant compression Ratings

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	PRESSURE (psi)	TENSILE (lb)	COLLAPSE (psi)
5.39	4.76	4.69	0.33	6.60	....	....	....	4.50	1500	48000	1800
5.55	5.85	4.69	0.40	7.00	....	....	....	4.50	2000	58000	2100
6.73	7.45	5.89	0.40	8.40	....	....	....	4.63	1500	75000	1800
6.95	9.31	5.89	0.51	8.75	....	....	....	4.63	2000	90000	2200
8.80	13.56	7.69	0.53	11.50	....	....	....	4.88	1500	125000	1800
9.09	16.37	7.69	0.68	11.90	....	....	....	4.88	2000	160000	2200

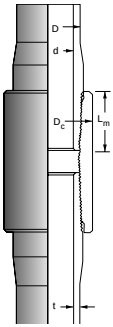
Star Fiber Glass Systems, Inc.—Advanced Composite Thread

Type: OD 8 Round, Integral joint Seal: Thread lubricant compression Ratings

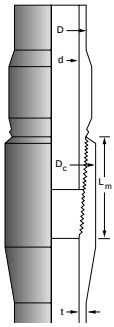
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	PRESSURE (psi)	TENSILE (lb)	COLLAPSE (psi)
6.73	7.08	5.89	0.40	8.40	....	....	....	4.63	1500	75000	1800
6.95	8.97	5.89	0.51	8.70	....	....	....	4.63	2000	90000	2200



SMITH FIBERGLASS PRODUCTS SDT fiberglass casing is an external upset integral joint or coupled connection manufactured with conventional API 8RD EUE long form threads that enable direct connection to packers and tools without the need for adaptors. Precision-formed threads are self-sealing when assembled with teflon-filled thread lubricant precluding the need for O-rings or other secondary seal. Highly corrosion resistant. It is engineered to bear normal downhole tensile loads and internal pressure up to 3,000 psig.



STAR FIBER GLASS SYSTEMS, INC. ACT Coupled casing features premium molded API 8RD EUE long form threaded and coupled connection. Threads are molded for smooth, sealed, corrosion-resistant thread surface with graphite and ceramic reinforcement, which provides lower breakout torque values. Precision threads use graphite as an added lubricant to avoid damage and wear. It is designed and manufactured to resist creep, maximize tensile strength and guarantee breakout. Laminate handles up to 4,000 psi at 200°F.

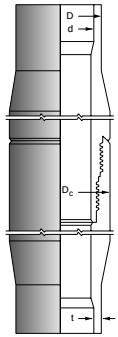


STAR FIBER GLASS SYSTEMS, INC. ACT Integral casing features premium molded API 8RD EUE long form integral joint connection. Threads are molded for smoother, sealed, corrosion-resistant thread surface with graphite and ceramic reinforcement, which provide lower breakout torque values. Precision threads use graphite as an added lubricant to avoid thread damage and wear. It is designed and manufactured to resist creep, maximize tensile strength and guarantee breakout. Laminate handles up to 4,000 psi at 200°F.

TPS Technitube Röhrenwerke—TPS-Multiseal-TS 4

Type: Integral Seal: Metal-to-metal Minimum joint tension strength, kips

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	18.0	4.276	0.362	5.515	...	5.275	> At	5.270	...	290	290	422	422	...	501	580	...
5.000	20.3	4.184	0.408	5.585	...	5.886	> At	5.270	...	324	324	471	471	...	559	647	...
5.000	23.2	4.044	0.478	5.700	...	6.791	> At	5.270	...	373	373	543	543	...	645	747	...
5.000	27.0	3.880	0.560	5.835	...	7.811	> At	5.270	...	430	430	625	625	...	742	859	...
5.500	17.0	4.892	0.304	5.920	...	4.962	> At	5.270	...	273	273	397	397	...	471	546	...
5.500	20.0	4.778	0.361	6.005	...	5.828	> At	5.270	...	320	320	466	466	...	554	641	...
5.500	23.0	4.670	0.415	6.090	...	6.630	> At	5.270	...	365	365	530	530	...	630	729	...
5.500	26.0	4.548	0.476	6.185	...	7.513	> At	5.270	...	413	413	601	601	...	714	826	...
5.500	28.4	4.440	0.530	6.275	...	8.275	> At	5.270	...	455	455	662	662	...	786	910	...
6.625	28.0	5.791	0.417	7.210	...	8.133	> At	5.260	...	447	447	651	651	...	773	895	...
6.625	32.0	5.675	0.475	7.300	...	9.177	> At	5.260	...	505	505	688	734	...	872	1009	...
6.625	35.0	5.575	0.525	7.380	...	10.061	> At	5.260	...	553	553	805	805	...	956	1107	...
7.000	29.0	6.184	0.408	7.570	...	8.449	> At	5.280	...	465	465	676	676	...	803	929	...
7.000	32.0	6.094	0.453	7.640	...	9.317	> At	5.280	...	512	512	745	745	...	885	1025	...
7.000	35.0	6.004	0.498	7.710	...	10.172	> At	5.280	...	559	559	814	814	...	966	1119	...
7.000	38.0	5.920	0.540	7.775	...	10.959	> At	5.280	...	603	603	877	877	...	1041	1205	...



TPS TECHNITUBE TPS-Multiseal-TS-4 is a high-performance, premium, two-step integral joint connection for high pressure service. Available with medium and heavy-weight tubing. Thread profile with multiple metal-to-metal seals and torque shoulders utilizes four threads per inch. Increased upset length guarantees 90% repairability by recutting in case of thread damage.

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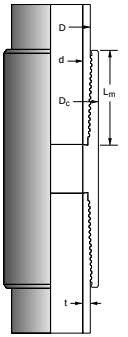
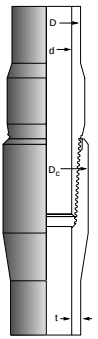


TPS TECHNITUBE Techniseal is a high-performance non-upset tubing and casing coupling with buttress type threads, high-compression tapered metal-to-metal seal and reverse angle shoulder. Full pipe strength is provided for tension, compression, bending, and internal and external pressures. It will withstand repeated make/break and is fast running, and flush ID minimizes corrosion/erosion. It is also recommended for high-strength and special alloy materials.

TPS Technitube Röhrenwerke—Techniseal

Type: Coupled Seal: Metal-to-metal Minimum joint tension strength, kips

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.494	0.253	5.587	5.390	3.773	5.498	4.252	...	208	208	302	302	340	359	415	...
5.000	15.0	4.408	0.296	5.587	5.390	4.374	5.498	4.252	...	241	241	350	350	394	416	481	...
5.000	18.0	4.276	0.362	5.587	5.390	5.275	5.498	4.252	...	290	290	422	422	474	501	580	...
5.000	20.3	4.184	0.408	5.587	5.390	5.886	5.498	4.252	...	302	302	440	440	495	522	605	...
5.000	20.8	4.156	0.422	5.587	5.390	6.069	5.498	4.252	...	302	302	440	440	495	522	605	...
5.000	21.4	4.125	0.437	5.587	5.390	6.264	5.498	4.252	...	302	302	440	440	495	522	605	...
5.000	24.1	4.000	0.500	5.587	5.390	7.069	5.498	4.252	...	302	302	440	440	495	522	605	...
5.500	15.5	4.950	0.275	6.075	5.890	4.514	5.975	4.331	...	248	248	361	361	406	429	564	...
5.500	17.0	4.892	0.304	6.075	5.890	4.962	5.975	4.331	...	273	273	397	397	447	471	546	...
5.500	20.0	4.778	0.361	6.075	5.890	5.828	5.975	4.331	...	321	321	466	466	525	554	641	...
5.500	23.0	4.670	0.415	6.075	5.890	6.630	5.975	4.331	...	329	329	478	478	538	568	657	...
5.500	26.0	4.548	0.476	6.075	5.890	7.513	5.975	4.331	...	329	329	478	478	538	568	657	...
6.625	20.0	6.049	0.288	7.413	7.016	5.734	9.667	4.528	...	316	316	459	459	516	545	631	...
6.625	23.2	5.965	0.330	7.413	7.016	6.526	9.667	4.528	...	359	359	522	522	587	620	718	...
6.625	24.0	5.921	0.352	7.413	7.016	6.937	9.667	4.528	...	381	381	555	555	624	659	763	...
6.625	28.0	5.791	0.417	7.413	7.016	8.133	9.667	4.528	...	447	447	651	651	732	772	894	...
6.625	32.0	5.675	0.475	7.413	7.016	9.177	9.667	4.528	...	505	505	734	734	826	872	1009	...
6.625	35.0	5.575	0.525	7.413	7.016	10.061	9.667	4.528	...	532	532	774	774	870	919	1064	...
7.000	23.0	6.366	0.317	7.681	7.390	6.655	9.066	4.724	...	366	366	532	532	599	632	732	...
7.000	26.0	6.276	0.362	7.681	7.390	7.549	9.066	4.724	...	415	415	604	604	679	717	830	...
7.000	29.0	6.184	0.408	7.681	7.390	8.449	9.066	4.724	...	465	465	676	676	760	802	929	...
7.000	32.0	6.094	0.453	7.681	7.390	9.317	9.066	4.724	...	499	499	725	725	816	861	997	...
7.000	35.0	6.004	0.498	7.681	7.390	10.172	9.066	4.724	...	499	499	725	725	816	861	997	...
7.000	38.0	5.920	0.540	7.681	7.390	10.959	9.066	4.724	...	499	499	725	725	816	861	997	...
7.000	41.0	5.820	0.590	7.681	7.390	11.881	9.066	4.724	...	499	499	725	725	816	861	997	...
7.000	44.0	5.720	0.640	7.681	...	12.788	14.792	4.724	...	499	499	725	725	816	861	997	...
7.000	46.0	5.660	0.670	7.683	...	13.324	14.792	4.724	...	500	500	727	727	818	864	1000	...
7.625	26.4	6.969	0.328	8.528	8.142	7.519	12.899	4.921	...	413	413	601	601	677	714	827	...
7.625	29.7	6.875	0.375	8.528	8.142	8.541	12.899	4.921	...	470	470	683	683	768	811	939	...
7.625	33.7	6.765	0.430	8.528	8.142	9.720	12.899	4.921	...	534	534	777	777	875	923	1069	...
7.625	35.8	6.693	0.466	8.528	8.142	10.481	12.899	4.921	...	575	575	836	836	941	993	1150	...
7.625	39.0	6.625	0.500	8.528	8.142	11.192	12.899	4.921	...	616	616	895	895	1007	1063	1231	...
7.625	42.8	6.501	0.562	8.528	8.142	12.470	12.899	4.921	...	686	686	997	997	1122	1184	1371	...
7.625	45.3	6.435	0.595	8.528	8.142	13.141	12.899	4.921	...	710	710	1032	1032	1161	1226	1419	...
8.625	28.0	8.017	0.304	9.650	9.142	7.947	16.399	5.039	...	437	437	636	636	715	755	874	...
8.625	32.0	7.921	0.352	9.650	9.142	9.149	16.399	5.039	...	503	503	732	732	823	869	1006	...
8.625	36.0	7.825	0.400	9.650	9.142	10.336	16.399	5.039	...	568	568	827	827	930	982	1137	...
8.625	40.0	7.725	0.450	9.650	9.142	11.557	16.399	5.039	...	636	636	925	925	1040	1098	1271	...
8.625	44.0	7.625	0.500	9.650	9.142	12.763	16.399	5.039	...	702	702	1021	1021	1149	1212	1404	...
8.625	49.0	7.511	0.557	9.650	9.142	14.118	16.399	5.039	...	777	777	1130	1130	1271	1341	1553	...
8.625	52.0	7.435	0.595	9.650	9.142	15.010	16.399	5.039	...	825	825	1201	1201	1351	1426	1651	...



TUBULAR FIBERGLASS CORP. RED BOX tubing is an external upset, integral connection. It features conventional API 8RD ELE long form threads that allow direct tie-in to packers and wellhead equipment without changeovers. Laminate construction holds pressure without use of a sealing liner. Highly corrosion resistant, it is available in multiple pressure classifications up to 3,000 psi at 210°F. Tubing features reusable fiberglass connection that can be installed with controlled torque power tongs.

Tubular Fiberglass Corp.—RED BOX

Type: 8 round, integral Seal: Threaded Minimum joint tension strength, kips

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	All grades
5.500	2.8	4.330	0.19	6.78	6.125	1.349	....	3.500	69
5.500	3.3	4.330	0.23	6.78	6.125	1.640	....	3.500	86
5.500	3.9	4.330	0.28	6.78	6.125	2.007	....	3.500	103
5.500	4.6	4.330	0.34	6.78	6.125	2.453	....	3.500	107
5.500	5.2	4.330	0.38	6.78	6.125	2.754	....	3.500	107
5.500	5.9	4.330	0.44	6.78	6.125	3.210	....	3.500	107
5.500	6.6	4.330	0.49	6.78	6.125	3.593	....	3.500	107
5.500	7.3	4.330	0.55	6.78	6.125	4.059	....	3.500	107
5.500	8.0	4.330	0.60	6.78	6.125	4.452	....	3.500	107
6.675	4.1	5.340	0.23	8.00	7.375	2.005	....	3.875	103
6.675	4.9	5.340	0.28	8.00	7.375	2.451	....	3.875	126
6.675	5.9	5.340	0.35	8.00	7.375	3.084	....	3.875	143
6.675	6.8	5.340	0.41	8.00	7.375	3.632	....	3.875	143
6.675	7.7	5.340	0.47	8.00	7.375	4.185	....	3.875	143
6.675	8.7	5.340	0.53	8.00	7.375	4.744	....	3.875	143
6.675	9.7	5.340	0.59	8.00	7.375	5.309	....	3.875	143
6.675	10.8	5.340	0.66	8.00	7.375	5.975	....	3.875	143
7.000	4.9	6.120	0.26	8.50	7.625	2.591	....	4.000	134
7.000	6.1	6.120	0.33	8.50	7.625	3.307	....	4.000	156
7.000	7.2	6.120	0.40	8.50	7.625	4.030	....	4.000	156
7.000	8.3	6.120	0.46	8.50	7.625	4.656	....	4.000	156
7.625	5.5	6.120	0.26	9.23	8.500	2.591	....	4.000	136
7.625	6.7	6.120	0.33	9.23	8.500	3.307	....	4.000	170
7.625	7.7	6.120	0.39	9.23	8.500	3.926	....	4.000	170
7.625	8.9	6.120	0.46	9.23	8.500	4.656	....	4.000	170
7.625	10.1	6.120	0.53	9.23	8.500	5.394	....	4.000	170
7.625	11.4	6.120	0.61	9.23	8.500	6.246	....	4.000	170
7.625	12.8	6.120	0.68	9.23	8.500	7.000	....	4.000	170
7.625	14.2	6.120	0.76	9.23	8.500	7.872	....	4.000	170
9.625	8.9	7.750	0.33	11.60	10.625	4.151	....	4.000	215
9.625	10.7	7.750	0.41	11.60	10.625	5.184	....	4.000	215
9.625	12.4	7.750	0.50	11.60	10.625	6.357	....	4.000	215
9.625	14.4	7.750	0.59	11.60	10.625	7.543	....	4.000	215
9.625	16.3	7.750	0.68	11.60	10.625	8.741	....	4.000	215
9.625	18.3	7.750	0.77	11.60	10.625	9.953	....	4.000	215
9.625	20.4	7.750	0.86	11.60	10.625	11.177	....	4.000	215
9.625	22.5	7.750	0.95	11.60	10.625	12.414	....	4.000	215
10.750	11.4	8.760	0.37	13.00	11.875	5.253	....	4.000	240
10.750	13.6	8.760	0.46	13.00	11.875	6.564	....	4.000	240
10.750	15.9	8.760	0.56	13.00	11.875	8.034	....	4.000	240
10.750	18.3	8.760	0.66	13.00	11.875	9.521	....	4.000	240
10.750	20.7	8.760	0.76	13.00	11.875	11.023	....	4.000	240
10.750	23.2	8.760	0.87	13.00	11.875	12.694	....	4.000	240
10.750	25.7	8.760	0.97	13.00	11.875	14.229	....	4.000	240
10.750	28.4	8.760	1.07	13.00	11.875	15.780	....	4.000	240

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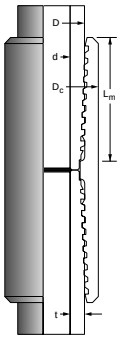
VAM Group*—DINO VAM

Type: Coupled Seal: Metal-to-metal

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
9.625	36.0	8.765	0.352	10.625	....	10.254	18.451	4.747	....	564	564	820	820	923	974	1128	....
9.625	40.0	8.679	0.395	10.625	....	11.454	18.451	4.747	....	630	630	916	916	1031	1088	1260	....
9.625	43.5	8.599	0.435	10.625	....	12.559	18.451	4.747	....	691	691	1005	1005	1130	1193	1381	....
9.625	47.0	8.525	0.472	10.625	....	13.572	18.451	4.747	....	746	746	1086	1086	1221	1289	1493	....
9.625	53.5	8.379	0.545	10.625	....	15.546	18.451	4.747	....	855	855	1244	1244	1399	1477	1710	....
9.625	58.4	8.279	0.595	10.625	....	16.879	18.451	4.747	....	928	928	1350	1350	1519	1604	1857	....
9.625	59.4	8.251	0.609	10.625	....	17.250	20.401	4.578	....	949	949	1380	1380	1553	1639	1898	....
9.625	61.1	8.219	0.625	10.625	....	17.671	20.401	4.578	....	972	972	1414	1414	1590	1679	1944	....
9.625	64.9	8.125	0.672	10.625	....	18.901	20.401	4.578	....	1040	1040	1512	1512	1701	1796	2079	....
9.625	70.3	8.001	0.734	10.625	....	20.502	20.401	4.578	....	1122	1122	1632	1632	1836	1938	2244	....
9.625	71.8	7.969	0.750	10.625	....	20.911	20.401	4.578	....	1122	1122	1632	1632	1836	1938	2244	....
9.750	59.2	8.404	0.595	10.625	....	17.113	17.785	4.155	....	941	941	1369	1369	1540	1626	1882	....
9.750	60.2	8.376	0.609	10.625	....	17.489	17.785	4.155	....	962	962	1399	1399	1574	1661	1924	....
9.875	62.8	8.469	0.625	10.870	....	18.162	20.655	4.488	....	999	999	1453	1453	1635	1725	1998	....
9.875	66.4	8.397	0.661	10.870	....	19.134	20.655	4.488	....	1052	1052	1531	1531	1722	1818	2105	....
9.875	67.5	8.363	0.678	10.870	....	19.590	20.655	4.488	....	1077	1077	1567	1567	1763	1861	2155	....
9.875	68.9	8.319	0.700	10.870	....	20.177	20.655	4.488	....	1110	1110	1614	1614	1816	1917	2219	....
9.875	70.5	8.279	0.720	10.870	....	20.708	20.655	4.488	....	1136	1136	1652	1652	1859	1962	2272	....
10.750	40.5	9.894	0.350	11.750	....	11.435	20.993	5.044	....	629	629	915	915	1029	1086	1258	....
10.750	45.5	9.794	0.400	11.750	....	13.006	20.993	5.044	....	715	715	1040	1040	1171	1236	1431	....
10.750	51.0	9.694	0.450	11.750	....	14.561	20.993	5.044	....	801	801	1165	1165	1310	1383	1602	....
10.750	55.5	9.604	0.495	11.750	....	15.947	20.993	5.044	....	877	877	1276	1276	1435	1515	1754	....
10.750	60.7	9.504	0.545	11.750	....	17.473	20.993	5.044	....	961	961	1398	1398	1573	1660	1922	....
10.750	65.7	9.404	0.595	11.750	....	18.982	20.993	5.044	....	1044	1044	1519	1519	1708	1803	2088	....
10.750	66.2	9.372	0.611	11.750	....	19.462	23.417	4.896	....	1070	1070	1557	1557	1752	1849	2141	....
10.750	73.2	9.250	0.672	11.750	....	21.276	23.417	4.896	....	1170	1170	1702	1702	1915	2021	2340	....
10.750	76.1	9.176	0.709	11.750	....	22.365	23.417	4.896	....	1230	1230	1789	1789	2013	2125	2460	....
10.750	79.2	9.126	0.734	11.750	....	23.096	23.417	4.896	....	1270	1270	1848	1848	2079	2194	2541	....
11.750	47.0	10.844	0.375	12.750	....	13.401	22.078	4.485	....	737	737	1072	1072	1206	1273	1474	....
11.750	54.0	10.724	0.435	12.750	....	15.463	22.078	4.485	....	850	850	1237	1237	1392	1469	1701	....
11.750	60.0	10.616	0.489	12.750	....	17.300	24.388	4.365	....	952	952	1384	1384	1557	1644	1903	....
11.750	65.0	10.526	0.534	12.750	....	18.816	24.388	4.365	....	1035	1035	1505	1505	1693	1788	2070	....
11.750	71.0	10.430	0.582	12.750	....	20.420	24.388	4.365	....	1123	1123	1634	1634	1838	1940	2246	....
11.875	71.8	10.555	0.582	12.677	....	20.648	20.629	4.365	....	1135	1135	1650	1650	1857	1960	2269	....
13.375	54.5	12.459	0.380	14.375	....	15.513	25.502	4.762	....	853	853	1241	1241	1396	1474	1706	....
13.375	61.0	12.359	0.430	14.375	....	17.487	25.502	4.762	....	962	962	1399	1399	1574	1661	1924	....
13.375	68.0	12.259	0.480	14.375	....	19.445	25.502	4.762	....	1069	1069	1556	1556	1750	1847	2139	....
13.375	72.0	12.191	0.514	14.375	....	20.768	25.502	4.762	....	1142	1142	1661	1661	1869	1973	2284	....
13.375	77.0	12.119	0.550	14.375	....	22.160	28.047	4.516	....	1219	1219	1773	1773	1994	2105	2438	....
13.375	80.7	12.059	0.580	14.375	....	23.314	28.047	4.516	....	1282	1282	1865	1865	2098	2215	2565	....
13.375	85.0	12.003	0.608	14.375	....	24.386	28.047	4.516	....	1341	1341	1951	1951	2195	2317	2682	....
13.375	86.0	11.969	0.625	14.375	....	25.035	28.047	4.516	....	1377	1377	2003	2003	2253	2378	2754	....
13.625	88.2	12.219	0.625	14.488	....	25.525	25.453	4.516	....	1400	1400	2036	2036	2291	2418	2800	....
14.000	82.5	12.689	0.562	15.043	....	23.726	33.094	5.528	....	1305	1305	1898	1898	2135	2254	2610	....
14.000	86.0	12.613	0.600	15.043	....	25.258	33.094	5.528	....	1389	1389	2021	2021	2273	2400	2778	....
14.000	93.0	12.513	0.650	15.043	....	27.261	33.094	5.528	....	1499	1499	2181	2181	2453	2590	2999	....
14.000	94.8	12.501	0.656	15.043	....	27.500	33.094	5.528	....	1513	1513	2200	2200	2475	2613	3025	....
14.000	99.0	12.437	0.688	15.043	....	28.773	33.094	5.528	....	1583	1583	2302	2302	2590	2733	3165	....
14.000	100.0	12.413	0.700	15.043	....	29.248	33.094	5.528	....	1609	1609	2340	2340	2632	2779	3217	....
14.000	114.0	12.213	0.800	15.043	....	33.175	33.094	5.528	....	1820	1820	2648	2648	2978	3144	3640	....
16.000	65.0	15.063	0.375	17.000	....	18.408	31.414	5.212	....	1012	1012	1473	1473	1657	1749	2025	....
16.000	75.0	14.937	0.438	17.000	....	21.414	31.414	5.212	....	1178	1178	1713	1713	1927	2034	2356	....
16.000	84.0	14.823	0.495	17.000	....	24.112	31.414	5.212	....	1326	1326	1929	1929	2170	2291	2652	....
16.000	84.8	14.813	0.500	17.000	....	24.347	31.414	5.212	....	1339	1339	1948	1948	2191	2313	2678	....
16.000	94.5	14.689	0.562	17.000	....	27.257	37.602	5.843	....	1499	1499	2181	2181	2453	2589	2998	....
16.000	104.0	14.563	0.625	17.000	....	30.189	37.602	5.843	....	1660	1660	2415	2415	2717	2868	3321	....
16.000	109.0	14.501	0.656	17.000	....	31.622	37.602	5.843	....	1739	1739	2530	2530	2846	3004	3478	....
16.000	128.0	14.251	0.781	17.000	....	37.341	37.602	5.843	....	2054	2054	2987	2987	3361	3547	4108	....



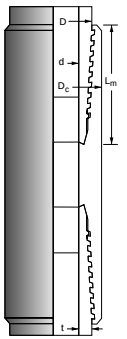
DINO VAM is a cost-effective threaded and coupled connection for surface and intermediate casing applications. Increased running reliability and reduced rig costs result from its deep stabbing, non cross-threading and fast make up. Sealing and structural strength are provided by a coarse 3-TPI tapered, hooded thread design. The connection is immune to jump in/jump out.

VAM Group*—NEW VAM

Type: Coupled Seal: Metal-to-metal

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.494	0.253	5.587	5.390	3.773	5.499	4.724	....	208	208	302	302	340	358	415	472
5.000	15.0	4.408	0.296	5.587	5.390	4.374	5.499	4.724	....	241	241	350	350	394	416	481	547
5.000	18.0	4.276	0.362	5.587	5.390	5.275	5.499	4.724	....	290	290	422	422	475	501	580	659
5.000	20.3	4.184	0.408	5.587	5.390	5.886	5.499	4.724	....	302	302	440	440	495	522	605	687
5.000	20.8	4.156	0.422	5.587	5.390	6.069	5.499	4.724	....	302	302	440	440	495	522	605	687
5.000	21.4	4.126	0.437	5.587	5.390	6.264	5.499	4.724	....	302	302	440	440	495	522	605	687
5.000	23.2	4.044	0.478	5.587	5.390	6.791	5.499	4.724	....	302	302	440	440	495	522	605	687
5.000	24.1	4.000	0.500	5.587	5.390	7.069	5.499	4.724	....	302	302	440	440	495	522	605	687
5.500	14.0	5.012	0.244	6.075	5.890	4.029	5.977	4.850	....	222	222	322	322	363	383	443	504
5.500	15.5	4.950	0.275	6.075	5.890	4.514	5.977	4.850	....	248	248	361	361	406	429	497	564
5.500	17.0	4.892	0.304	6.075	5.890	4.962	5.977	4.850	....	273	273	397	397	447	471	546	620
5.500	20.0	4.778	0.361	6.075	5.890	5.828	5.977	4.850	....	321	321	466	466	525	554	641	729
5.500	23.0	4.670	0.415	6.075	5.890	6.630	5.977	4.850	....	329	329	478	478	538	568	657	747
5.500	26.0	4.548	0.476	6.075	5.890	7.513	5.977	4.850	....	329	329	478	478	538	568	657	747
6.625	20.0	6.049	0.288	7.413	7.016	5.734	9.669	4.965	....	315	315	459	459	516	545	631	717
6.625	23.2	5.965	0.330	7.413	7.016	6.526	9.669	4.965	....	359	359	522	522	587	620	718	816
6.625	24.0	5.921	0.352	7.413	7.016	6.937	9.669	4.965	....	382	382	555	555	624	659	763	867
6.625	28.0	5.791	0.417	7.413	7.016	8.133	9.669	4.965	....	447	447	651	651	732	773	895	1017
6.625	32.0	5.675	0.475	7.413	7.016	9.177	9.669	4.965	....	505	505	734	734	826	872	1009	1147
6.625	35.0	5.575	0.525	7.413	7.016	10.061	9.669	4.965	....	532	532	774	774	870	919	1064	1209
7.000	23.0	6.366	0.317	7.681	7.390	6.655	9.066	5.228	....	366	366	532	532	599	632	732	832
7.000	26.0	6.276	0.362	7.681	7.390	7.549	9.066	5.228	....	415	415	604	604	676	717	830	944
7.000	29.0	6.184	0.408	7.681	7.390	8.449	9.066	5.228	....	465	465	676	676	760	803	929	1056
7.000	32.0	6.094	0.453	7.681	7.390	9.317	9.066	5.228	....	499	499	725	725	816	861	997	1133
7.000	35.0	6.004	0.498	7.681	7.390	10.172	9.066	5.228	....	499	499	725	725	816	861	997	1133
7.000	38.0	5.920	0.540	7.681	7.390	10.959	9.066	5.228	....	499	499	725	725	816	861	997	1133

Table continues



NEW VAM is a versatile threaded and coupled, non-upset connection that provides high tensile and sealing performance for most casing applications. Sealing is provided by a tapered metal-to-metal seal system that is energized by a reverse angle torque shoulder. Standard coupling offers greater than 100% efficiency. Coupling options are available, including resilient seal rings for back-up sealing.

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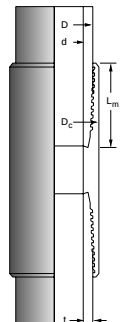
VAM Group—NEW VAM (continued)

										Minimum joint tension strength, kips							
D	w	d	t	D_c	D_{bc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
7.000	41.0	5.820	0.590	7.681	7.390	11.881	9.066	5.228	....	499	499	725	725	816	861	997	1133
7.000	44.0	5.720	0.640	7.681	....	12.788	9.066	5.228	....	499	499	725	725	816	861	997	1133
7.000	46.0	5.660	0.670	7.681	....	13.324	9.066	5.228	....	499	499	725	725	816	861	997	1133
7.625	26.4	6.969	0.328	8.528	8.142	7.519	12.901	5.406	....	414	414	602	602	677	714	827	940
7.625	29.7	6.875	0.375	8.528	8.142	8.541	12.901	5.406	....	470	470	683	683	769	811	940	1068
7.625	33.7	6.795	0.430	8.528	8.142	9.720	12.901	5.406	....	535	535	778	778	875	923	1069	1215
7.625	35.8	6.695	0.465	8.528	8.142	10.460	12.901	5.406	....	575	575	837	837	941	994	1151	1308
7.625	39.0	6.625	0.500	8.528	8.142	11.192	12.901	5.406	....	616	616	895	895	1007	1063	1231	1399
7.625	42.8	6.501	0.562	8.528	8.142	12.470	12.901	5.406	....	686	686	998	998	1122	1185	1372	1559
7.625	45.3	6.435	0.595	8.528	8.142	13.141	12.901	5.406	....	710	710	1032	1032	1161	1226	1419	1613
7.625	47.1	6.375	0.625	8.528	8.142	13.744	12.901	5.406	....	710	710	1032	1032	1161	1226	1419	1613
8.625	28.0	8.017	0.304	9.650	9.142	7.947	16.401	5.545	....	437	437	636	636	715	755	874	993
8.625	32.0	7.921	0.352	9.650	9.142	9.149	16.401	5.545	....	503	503	732	732	823	869	1006	1144
8.625	36.0	7.825	0.400	9.650	9.142	10.336	16.401	5.545	....	568	568	827	827	930	982	1137	1292
8.625	40.0	7.725	0.450	9.650	9.142	11.557	16.401	5.545	....	636	636	925	925	1040	1098	1271	1445
8.625	44.0	7.625	0.500	9.650	9.142	12.763	16.401	5.545	....	702	702	1021	1021	1149	1212	1404	1595
8.625	49.0	7.511	0.557	9.650	9.142	14.118	16.401	5.545	....	776	776	1129	1129	1271	1341	1553	1765
8.625	52.0	7.435	0.595	9.650	9.142	15.010	16.401	5.545	....	826	826	1201	1201	1351	1426	1651	1876
9.625	36.0	8.921	0.352	10.650	10.142	10.254	18.208	5.545	....	564	564	820	820	923	974	1128	1282
9.625	40.0	8.835	0.395	10.650	10.142	11.454	18.208	5.545	....	630	630	916	916	1031	1088	1260	1432
9.625	43.5	8.755	0.435	10.650	10.142	12.559	18.208	5.545	....	691	691	1005	1005	1130	1193	1381	1570
9.625	47.0	8.681	0.472	10.650	10.142	13.572	18.208	5.545	....	746	746	1086	1086	1221	1289	1493	1697
9.625	53.5	8.535	0.545	10.650	10.142	15.546	18.208	5.545	....	855	855	1244	1244	1399	1477	1710	1943
9.625	58.4	8.435	0.595	10.650	10.142	16.879	18.208	5.545	....	928	928	1350	1350	1519	1604	1857	2110
9.625	59.4	8.407	0.609	10.650	10.142	17.250	18.208	5.545	....	949	949	1380	1380	1553	1639	1898	2156
9.625	61.1	8.375	0.625	10.650	10.142	17.671	18.208	5.545	....	972	972	1414	1414	1590	1679	1944	2209
10.750	40.5	10.050	0.350	11.772	11.268	11.435	20.186	5.589	....	629	629	915	915	1029	1086	1258	1429
10.750	45.5	9.950	0.400	11.772	11.268	13.006	20.186	5.589	....	715	715	1040	1040	1171	1236	1431	1626
10.750	51.0	9.850	0.450	11.772	11.268	14.561	20.186	5.589	....	801	801	1165	1165	1310	1383	1602	1820
10.750	55.5	9.760	0.495	11.772	11.268	15.947	20.186	5.589	....	877	877	1276	1276	1435	1515	1754	1993
10.750	60.7	9.660	0.545	11.772	11.268	17.473	20.186	5.589	....	961	961	1398	1398	1573	1660	1922	2184
10.750	65.7	9.560	0.595	11.772	11.268	18.982	20.186	5.589	....	1044	1044	1519	1519	1708	1803	2088	2373
11.750	47.0	11.000	0.375	12.772	12.268	13.401	21.988	5.589	....	737	737	1072	1072	1206	1273	1474	1675
11.750	54.0	10.880	0.435	12.772	12.268	15.463	21.988	5.589	....	850	850	1237	1237	1392	1469	1701	1933
11.750	60.0	10.772	0.489	12.772	12.268	17.300	21.988	5.589	....	952	952	1384	1384	1557	1644	1903	2163
11.750	65.0	10.682	0.534	12.772	12.268	18.816	21.988	5.589	....	1035	1035	1505	1505	1693	1788	2070	2352
13.375	54.5	12.615	0.380	14.398	14.126	15.513	24.879	5.642	....	853	853	1241	1241	1396	1474	1706	1939
13.375	61.0	12.515	0.430	14.398	14.126	17.487	24.879	5.642	....	962	962	1399	1399	1574	1661	1924	2186
13.375	68.0	12.415	0.480	14.398	14.126	19.445	24.879	5.642	....	1069	1069	1556	1556	1750	1847	2139	2431
13.375	72.0	12.347	0.514	14.398	14.126	20.768	24.879	5.642	....	1142	1142	1661	1661	1869	1973	2284	2596
13.375	77.0	12.275	0.550	14.398	14.126	22.160	24.879	5.642	....	1219	1219	1773	1773	1994	2105	2438	2770
13.375	80.7	12.215	0.580	14.398	14.126	23.314	24.879	5.642	....	1282	1282	1865	1865	2098	2215	2565	2914
13.375	85.0	12.159	0.608	14.398	14.126	24.386	24.879	5.642	....	1341	1341	1951	1951	2195	2317	2682	3048
13.375	86.0	12.125	0.625	14.398	14.126	25.035	24.879	5.642	....	1368	1368	1990	1990	2239	2364	2737	3110
13.625	88.2	12.375	0.625	14.678	....	25.525	26.026	5.642	....	1404	1404	2042	2042	2297	2425	2808	3191



VAM ACE is ideal for critical environments. It features a low angle, metal-to-metal seal that is further energized by a reverse-angle torque shoulder. Thread and seal geometry, developed specifically for CRA materials, avoids high local contact pressure during stabbing, or in early make-up stages, prevents galling. Tapered thread with –3° reverse angle load flank prevents jump-out under tension.

VAM Group*—VAM ACE

Type: Coupled **Seal: Metal-to-metal**

									Minimum joint tension strength, kips							
D	w	d	t	D_c	D_{bc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.494	0.253	5.563	5.323	3.773	5.299	4.191	....	208	208	302	302	340	358	415	472
5.000	15.0	4.408	0.296	5.563	5.354	4.374	5.299	4.191	....	241	241	350	350	394	416	481	547
5.000	18.0	4.276	0.362	5.572	5.439	5.275	5.379	4.191	....	290	290	422	422	475	501	580	659
5.000	20.3	4.184	0.408	5.650	5.500	5.886	6.065	4.191	....	324	324	471	471	530	559	647	736
5.000	20.8	4.156	0.422	5.750	5.531	6.069	6.961	4.191	....	334	334	486	486	546	577	668	759
5.000	21.4	4.126	0.437	5.750	5.531	6.264	6.961	4.191	....	345	345	501	501	564	595	689	783
5.000	23.2	4.044	0.478	5.750	5.583	6.791	6.961	4.191	....	374	374	543	543	611	645	747	849
5.000	24.1	4.000	0.500	5.806	5.604	7.069	7.468	4.191	....	389	389	566	566	636	672	778	884
5.500	15.5	4.950	0.275	6.051	5.840	4.514	5.800	4.382	....	248	248	361	361	406	429	497	564
5.500	17.0	4.892	0.304	6.051	5.866	4.962	5.800	4.382	....	273	273	397	397	447	471	546	620
5.500	20.0	4.778	0.361	6.150	5.931	5.828	6.744	4.382	....	321	321	466	466	525	554	641	729
5.500	23.0	4.670	0.415	6.150	6.000	6.630	6.744	4.382	....	365	365	530	530	597	630	729	829
5.500	26.0	4.548	0.476	6.244	6.075	7.513	7.663	4.382	....	413	413	601	601	676	714	826	939
5.500	26.8	4.500	0.500	6.280	6.118	7.854	8.012	4.382	....	432	432	628	628	707	746	864	982
5.500	28.4	4.440	0.530	6.325	6.150	8.275	8.460	4.382	....	455	455	662	662	745	786	910	1034
5.500	29.7	4.376	0.562	6.385	6.193	8.718	9.061	4.382	....	479	479	697	697	785	828	959	1090
6.625	20.0	6.049	0.288	7.390	6.963	5.734	9.409	4.427	....	315	315	459	459	516	545	631	717
6.625	24.0	5.921	0.352	7.390	7.051	6.937	9.409	4.427	....	382	382	555	555	624	659	763	867
6.625	28.0	5.791	0.417	7.390	7.136	8.133	9.409	4.427	....	447	447	651	651	732	773	895	1017
6.625	32.0	5.675	0.475	7.390	7.211	9.177	9.409	4.427	....	505	505	734	734	826	872	1009	1147
6.625	35.0	5.575	0.525	7.463	7.291	10.061	10.258	4.427	....	553	553	805	805	905	956	1107	1258
7.000	23.0	6.366	0.317	7.657	7.390	6.655	8.857	4.476	....	366	366	532	532	599	632	732	832
7.000	24.8	6.314	0.343	7.657	7.421	7.173	8.857	4.476	....	395	395	574	574	646	681	789	897
7.000	26.0	6.276	0.362	7.657	7.421	7.549	8.857	4.476	....	415	415	604	604	676	717	830	944
7.000	29.0	6.184	0.408	7.657	7.484	8.449	8.857	4.476	....	465	465	676	676	760	803	929	1056
7.000	32.0	6.094	0.453	7.909	7.555	9.317	11.937	4.476	....	512	512	745	745	839	885	1025	1165
7.000	35.0	6.004	0.498	7.909	7.618	10.172	11.937	4.476	....	559	559	814	814	915	966	1119	1272
7.000	38.0	5.920	0.540	7.909	7.657	10.959	11.937	4.476	....	603	603	877	877	986	1041	1205	1370
7.000	41.0	5.820	0.590	7.940	7.713	11.881	12.319	4.476	....	653	653	950	950	1069	1129	1307	1485
7.625	26.4	6.969	0.328	8.500	8.000	7.519	12.543	4.868	....	414	414	602	602	677	714	827	940
7.625	29.7	6.875	0.375	8.500	8.061	8.541	12.543	4.868	....	470	470	683	683	769	811	940	1068
7.625	33.7	6.795	0.430	8.500	8.136	9.720	12.543	4.868	....	535	535	778	778	875	923	1069	1215
7.625	35.8	6.695	0.465	8.500	8.181	10.460	12.543	4.868	....	575	575	837	837	941	994	1151	1308
7.625	39.0	6.625	0.500	8.500	8.228	11.192	12.543	4.868	....	616	616	895	895	1007	1063	1231	1399
7.625	42.8	6.501	0.562	8.513	8.313	12.470	12.716	4.868	....	686	686	998	998	1122	1185	1372	1559
7.625	45.3	6.435	0.595	8.564	8.346	13.141	13.403	4.868	....	723	723	1051	1051	1183	1248	1446	1643
7.750	46.1	6.560	0.595	8.691	8.494	13.374	13.638	4.868	....	736	736	1070	1070	1204	1271	1471	1672
7.750	47.6	6.500	0.625	8.737	8.531	13.990	14.274	4.868	....	769	769	1119	1119	1259	1329	1539	1749
7.750	48.6	6.470	0.640	8.760	8.551	14.296	14.582	4.868	....	786	786	1144	1144	1287	1358	1573	1787
8.625	28.0	8.017	0.304	9.626	8.957	7.947	16.120	5.604	....	437	437	636	636	715	755	874	993
8.625	32.0	7.921	0.352	9.626	9.026	9.149	16.120	5.604	....	503	503	732	732	823	869	1006	1144
8.625	36.0	7.825	0.400	9.626	9.094	10.336	16.120	5.604	....	568	568	827	827	930	982	1137	1292
8.625	40.0	7.725	0.450	9.626	9.165	11.557	16.120	5.604	....	636	636	925	925	1040	1098	1271	1445
8.625	44.0	7.625	0.500	9.626	9.240	12.763	16.120	5.604	....	702	702	1021	1021	1149	1212	1404	1595
8.625	49.0	7.511	0.557	9.626	9.315	14.118	16.120	5.604	....	776	776	1129	1129	1271	1341	1553	1765
8.625	52.0	7.435	0.595	9.626	9.350	15.010	16.120	5.604	....	826	826	1201	1201	1351	1426	1651	1876
9.625	36.0	8.921	0.352	10.625	10.031	10.254	17.827	5.589	....	564	564	820	820	923	974	1128	1282
9.625	40.0	8.835	0.395	10.625	10.098	11.454	17.827	5.589	....	630	630	916	916	1031	1088	1260	1432

Table continues

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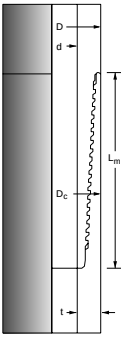
VAM Group—VAM ACE (continued)

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
9.625	43.5	8.755	0.435	10.625	10.165	12.559	17.827	5.589	....	691	691	1005	1005	1130	1193	1381	1570
9.625	47.0	8.681	0.472	10.625	10.228	13.572	17.827	5.589	....	746	746	1086	1086	1221	1289	1493	1697
9.625	53.5	8.535	0.545	10.625	10.297	15.546	17.827	5.589	....	855	855	1244	1244	1399	1477	1710	1943
9.625	58.4	8.435	0.595	10.650	10.382	16.879	17.827	5.589	....	928	928	1350	1350	1519	1604	1857	2110
9.625	59.4	8.407	0.609	10.625	10.382	17.250	17.827	5.589	....	949	949	1380	1380	1553	1639	1898	2156
9.625	61.1	8.375	0.625	10.637	10.402	17.671	18.023	5.589	....	972	972	1414	1414	1590	1679	1944	2209
9.875	62.8	8.625	0.625	10.898	10.661	18.162	18.550	5.484	....	999	999	1453	1453	1635	1725	1998	2270
9.875	66.4	8.553	0.661	10.954	10.709	19.134	19.516	5.484	....	1052	1052	1531	1531	1722	1818	2105	2392
9.875	70.5	8.435	0.720	11.047	10.780	20.708	21.130	5.484	....	1139	1139	1657	1657	1864	1967	2278	2589
10.750	40.5	10.050	0.350	11.750	11.156	11.435	19.863	5.634	....	629	629	915	915	1029	1086	1258	1429
10.750	45.5	9.950	0.400	11.750	11.226	13.006	19.863	5.634	....	715	715	1040	1040	1171	1236	1431	1626
10.750	51.0	9.850	0.450	11.750	11.299	14.561	19.863	5.634	....	801	801	1165	1165	1310	1383	1602	1820
10.750	55.5	9.760	0.495	11.750	11.378	15.947	19.863	5.634	....	877	877	1276	1276	1435	1515	1754	1993
10.750	60.7	9.660	0.545	11.750	11.449	17.473	19.863	5.634	....	961	961	1398	1398	1573	1660	1922	2184
10.750	65.7	9.560	0.595	11.750	11.524	18.982	19.863	5.634	....	1044	1044	1519	1519	1708	1803	2088	2373
11.750	47.0	11.000	0.375	12.750	12.193	13.401	21.638	5.713	....	737	737	1072	1072	1206	1273	1474	1675
11.750	54.0	10.880	0.435	12.750	12.280	15.463	21.638	5.713	....	850	850	1237	1237	1392	1469	1701	1933
11.750	60.0	10.772	0.489	12.750	12.358	17.300	21.638	5.713	....	952	952	1384	1384	1557	1644	1903	2163
11.750	65.0	10.682	0.534	12.750	12.441	18.816	21.638	5.713	....	1035	1035	1505	1505	1693	1788	2070	2352
11.875	71.8	10.711	0.582	12.835	12.608	20.648	21.061	5.713	....	1136	1136	1652	1652	1858	1962	2271	2581
13.375	54.5	12.615	0.380	14.375	13.829	15.513	24.510	5.698	....	853	853	1241	1241	1396	1474	1706	1939
13.375	61.0	12.515	0.430	14.375	13.902	17.487	24.510	5.698	....	962	962	1399	1399	1574	1661	1924	2186
13.375	68.0	12.415	0.480	14.375	13.982	19.445	24.510	5.698	....	1069	1069	1556	1556	1750	1847	2139	2431
13.375	72.0	12.347	0.514	14.375	14.022	20.768	24.510	5.698	....	1142	1142	1661	1661	1869	1973	2284	2596
13.375	77.0	12.275	0.550	14.375	14.073	22.160	24.510	5.698	....	1219	1219	1773	1773	1994	2105	2438	2770
13.375	80.7	12.215	0.580	14.375	14.116	23.314	24.510	5.698	....	1282	1282	1865	1865	2098	2215	2565	2914
13.375	85.0	12.159	0.608	14.420	14.173	24.386	25.524	5.698	....	1341	1341	1951	1951	2195	2317	2682	3048
13.375	86.0	12.125	0.625	14.420	14.173	25.035	25.524	5.698	....	1377	1377	2003	2003	2253	2378	2754	3129

VAM Group*—VAM FJL

Type: Integral **Seal: Metal-to-metal**

									Minimum joint tension strength, kips								
D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.494	0.253	....	....	3.773	2.079	2.795	....	....	....	198	208	....	218	260	281
5.000	15.0	4.408	0.296	....	....	4.374	2.407	3.504	....	....	....	229	241	....	253	301	325
5.000	18.0	4.276	0.362	....	....	5.275	3.205	3.425	....	....	....	304	321	....	337	401	433
5.000	20.3	4.184	0.408	....	....	5.886	3.818	4.213	....	....	....	393	382	....	401	477	515
5.000	20.8	4.156	0.422	....	....	6.069	3.999	4.213	....	....	....	380	400	....	420	500	540
5.000	21.4	4.126	0.437	....	....	6.264	4.083	4.331	....	....	....	388	408	....	429	510	551
5.000	23.2	4.044	0.478	....	....	6.791	4.574	5.039	....	....	....	435	457	....	480	572	617
5.000	24.1	4.000	0.500	....	....	7.069	4.574	5.039	....	....	....	435	457	....	480	572	617
5.500	15.5	4.950	0.275	....	....	4.514	2.488	2.874	....	....	....	236	249	....	261	311	336
5.500	17.0	4.892	0.304	....	....	4.962	2.736	3.346	....	....	....	260	274	....	287	342	369
5.500	20.0	4.778	0.361	....	....	5.828	3.421	3.386	....	....	....	325	342	....	359	428	462
5.500	23.0	4.670	0.415	....	....	6.630	4.221	4.252	....	....	....	401	422	....	443	528	570
5.500	26.0	4.548	0.476	....	....	7.513	5.031	4.843	....	....	....	478	503	....	528	629	679
5.500	28.4	4.400	0.530	....	....	8.275	5.391	5.315	....	....	....	512	539	....	566	674	728
6.625	23.2	5.965	0.330	....	....	6.526	3.584	2.953	....	....	....	340	358	....	376	448	484
6.625	24.0	5.921	0.352	....	....	6.937	3.994	2.953	....	....	....	379	399	....	419	499	539
6.625	28.0	5.791	0.417	....	....	8.133	5.189	3.976	....	....	....	493	519	....	545	649	701
6.625	32.0	5.675	0.475	....	....	9.177	6.040	4.724	....	....	....	574	604	....	634	755	815
6.625	35.0	5.575	0.525	....	....	10.061	6.780	5.512	....	....	....	644	678	....	712	848	915
7.000	23.0	6.366	0.317	....	....	6.655	3.401	2.638	....	....	....	323	340	....	357	425	459
7.000	26.0	6.276	0.362	....	....	7.549	4.297	3.150	....	....	....	408	430	....	451	537	580
7.000	29.0	6.184	0.408	....	....	8.449	5.199	3.701	....	....	....	494	520	....	546	650	702
7.000	32.0	6.094	0.453	....	....	9.317	6.064	4.291	....	....	....	576	606	....	637	758	819
7.000	35.0	6.004	0.498	....	....	10.172	6.642	4.843	....	....	....	631	664	....	697	830	897
7.000	38.0	5.920	0.540	....	....	10.959	7.152	5.354	....	....	....	679	715	....	751	894	966
7.000	41.0	5.820	0.590	....	....	11.881	7.736	5.945	....	....	....	735	774	....	812	967	1044
7.625	26.4	6.969	0.328	....	....	7.519	3.897	2.638	....	....	....	370	390	....	409	487	526
7.625	29.7	6.875	0.375	....	....	8.541	4.915	3.228	....	....	....	467	492	....	516	614	664
7.625	33.7	6.795	0.430	....	....	9.720	6.096	3.937	....	....	....	579	610	....	640	762	823
7.625	35.8	6.695	0.465	....	....	10.460	6.822	4.370	....	....	....	648	682	....	716	853	921
7.625	39.0	6.625	0.500	....	....	11.192	7.299	4.803	....	....	....	693	730	....	766	912	985
7.625	42.8	6.501	0.562	....	....	12.470	8.116	5.551	....	....	....	771	812	....	852	1015	1096
7.625	45.3	6.435	0.595	....	....	13.141	8.669	6.063	....	....	....	824	867	....	910	1084	1170
8.625	32.0	7.921	0.352	....	....	9.149	4.985	2.874	....	....	....	474	499	....	523	623	673
8.625	36.0	7.825	0.400	....	....	10.336	6.167	3.583	....	....	....	586	617	....	648	771	833
8.625	40.0	7.725	0.450	....	....	11.557	7.389	4.370	....	....	....	702	739	....	776	924	998
8.625	44.0	7.625	0.500	....	....	12.763	8.347	4.803	....	....	....	793	835	....	876	1043	1127
8.625	49.0	7.511	0.557	....	....	14.118	9.768	5.945	....	....	....	928	977	....	1026	1221	1319
8.625	52.0	7.435	0.595	....	....	15.010	9.768	5.945	....	....	....	928	977	....	1026	1221	1319
9.625	36.0	8.921	0.352	....	....	10.254	5.489	2.992	....	....	....	521	549	....	576	686	741
9.625	40.0	8.835	0.395	....	....	11.454	6.685	3.780	....	....	....	635	669	....	702	836	902
9.625	43.5	8.755	0.435	....	....	12.559	7.790	4.370	....	....	....	740	779	....	818	974	1052
9.625	47.0	8.681	0.472	....	....	13.572	8.804	4.370	....	....	....	836	880	....	924	1101	1189
9.625	53.5	8.535	0.545	....	....	15.546	10.126	5.276	....	....	....	962	1013	....	1063	1266	1367
9.625	58.4	8.435	0.595	....	....	16.879	11.499	6.260	....	....	....	1092	1150	....	1207	1437	1552
9.625	59.4	8.407	0.609	....	....	17.250	11.499	6.260	....	....	....	1092	1150	....	1207	1437	1552
9.625	61.1	8.375	0.625	....	....	17.671	11.499	6.260	....	....	....	1092	1150	....	1207	1437	1552
9.875	62.8	8.625	0.625	....	....	18.162	12.369	6.260	....	....	....	1175	1237	....	1299	1546	1670
10.750	40.5	10.050	0.350	....	....	11.435	5.989	2.874	....	....	....	569	599	....	629	749	809
10.750	45.5	9.950	0.400	....	....	13.006	7.559	3.858	....	....	....	718	756	....	794	945	1020
10.750	51.0	9.850	0.450	....	....	14.561	9.114	4.606	....	....	....	866	911	....	957	1139	1230
10.750	55.5	9.760	0.495	....	....	15.947	10.401	4.606	....	....	....	988	1040	....	1092	1300	1404
10.750	60.7	9.660	0.545	....	....	17.473	11.461	5.276	....	....	....	1089	1146	....	1203	1433	1547
10.750	65.7	9.560	0.595	....	....	18.982	12.451	5.906	....	....	....	1183	1245	....	1307	1556	1681
11.750	47.0	11.000	0.375	....	....	13.401	7.488	3.386	....	....	....	711	749	....	786	936	1011
11.750	54.0	10.880	0.435	....	....	15.463	9.233	4.961	....	....	....	877	923	....	969	1154	1246
11.750	60.0	10.772	0.489	....	....	17.300	10.985	4.252	....	....	....	1044	1099	....	1153	1373	1483
11.750	65.0	10.682	0.534	....	....	18.816	12.152	4.921	....	....	....	1154	1215	....	1276	1519	1641
11.875	71.8	10.711	0.582	....	....	20.648	13.514	5.630	....	....	....	1284	1351	....	1419	1689	1824



VAM FJL is an integral flush joint that provides maximum running clearance and optimum strength (65% efficiency under tension) on medium wall. It features reverse-angle load flank for load transmission and jump-out prevention. Ideal for moderate depth liners and tie-back strings.

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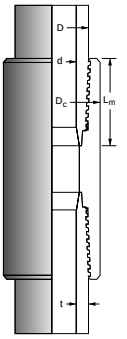
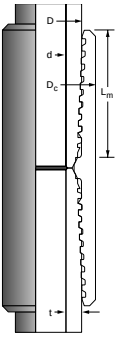


VAM HW is a super strength, threaded and coupled connection designed for extra-heavy casing. It is suitable for controlled-yield materials. Self-energizing, metal-to-metal seal system provides pressure integrity to API minimum yield. Tensile efficiency equals 100%. Hook threads with –3° reverse angle prevent jump-out under tension or bending, and reduce hoop stresses.

VAM Group*—VAM HW

Type: Coupled **Seal: Metal-to-metal**

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	30.6	3.700	0.650	5.713	....	8.883	9.060	6.081	....	....	....	711	711	799	844	977	1110
5.000	34.6	3.500	0.750	5.840	....	10.014	10.215	6.081	....	....	....	801	801	901	951	1102	1252
5.000	41.9	3.100	0.950	6.066	....	12.087	12.327	6.081	....	....	....	967	967	1088	1148	1330	1511
5.500	33.0	4.250	0.625	6.195	....	9.572	9.767	6.081	....	....	....	766	766	861	909	1053	1197
5.500	35.8	4.126	0.687	6.280	....	10.388	10.596	6.081	....	....	....	831	831	935	987	1143	1299
5.500	38.7	4.000	0.750	6.363	....	11.192	11.417	6.081	....	....	....	895	895	1007	1063	1231	1399
5.500	41.4	3.876	0.812	6.440	....	11.959	12.197	6.081	....	....	....	957	957	1076	1136	1315	1495
5.500	44.1	3.750	0.875	6.516	....	12.714	12.970	6.081	....	....	....	1017	1017	1144	1208	1399	1589
6.625	48.0	5.125	0.750	7.525	....	13.843	14.121	6.089	....	....	....	1107	1107	1246	1315	1523	1730
6.625	53.6	4.925	0.850	7.660	....	15.421	15.731	6.089	....	....	....	1234	1234	1388	1465	1696	1928
6.625	66.9	4.525	1.050	7.613	....	18.390	18.760	6.089	....	....	....	1471	1471	1655	1747	2023	2299
7.000	47.1	5.626	0.687	7.820	....	13.625	13.899	6.089	....	....	....	1090	1090	1226	1294	1499	1703
7.000	49.7	5.540	0.730	7.882	....	14.379	14.666	6.089	....	....	....	1150	1150	1294	1366	1582	1797
7.000	54.7	5.376	0.812	7.997	....	15.785	16.100	6.089	....	....	....	1263	1263	1421	1500	1736	1973
7.000	62.0	5.126	0.937	8.163	....	17.847	18.203	6.089	....	....	....	1428	1428	1606	1695	1963	2231
7.000	68.2	4.876	1.062	8.019	....	19.811	20.206	6.956	....	....	....	1585	1585	1783	1882	2179	2476
7.625	51.8	6.251	0.687	8.458	....	14.974	15.227	6.089	....	....	....	1198	1198	1348	1423	1647	1872
7.625	60.3	6.001	0.812	8.640	....	17.380	17.726	6.089	....	....	....	1390	1390	1564	1651	1912	2173
7.625	66.4	5.815	0.905	8.769	....	19.106	19.485	6.089	....	....	....	1528	1528	1720	1815	2102	2388
8.625	64.3	7.125	0.750	9.570	....	18.555	18.929	6.422	....	....	....	1484	1484	1670	1763	2041	2319
8.625	76.0	6.825	0.900	9.791	....	21.842	22.281	6.422	....	....	....	1747	1747	1966	2075	2403	2730
8.625	86.0	6.525	1.050	9.688	....	24.987	25.485	6.956	....	....	....	1999	1999	2249	2374	2749	3123
9.625	65.5	8.281	0.672	10.463	....	18.901	19.282	6.422	....	....	....	1512	1512	1701	1796	2079	2363
9.625	71.1	8.157	0.734	10.561	....	20.502	20.914	6.422	....	....	....	1640	1640	1845	1948	2255	2563
9.625	76.6	8.031	0.797	10.659	....	22.104	22.548	6.422	....	....	....	1768	1768	1989	2100	2431	2763
9.625	81.3	7.925	0.850	10.740	....	23.432	23.904	6.422	....	....	....	1875	1875	2109	2226	2578	2929
9.625	97.4	7.525	1.050	10.715	....	28.286	28.850	6.956	....	....	....	2263	2263	2546	2687	3111	3536
10.000	69.8	8.624	0.688	10.869	....	20.127	20.530	6.407	....	....	....	1610	1610	1811	1912	2214	2516
10.000	73.9	8.536	0.732	10.940	....	21.313	21.745	6.407	....	....	....	1705	1705	1918	2025	2344	2664
10.750	73.7	9.406	0.672	11.601	....	21.276	21.705	6.407	....	....	....	1702	1702	1915	2021	2340	2660
10.750	80.1	9.282	0.734	11.702	....	23.096	23.557	6.407	....	....	....	1848	1848	2079	2194	2541	2887
10.750	86.5	9.156	0.797	11.803	....	24.921	25.419	6.407	....	....	....	1994	1994	2243	2367	2741	3115
10.750	92.6	9.032	0.859	11.900	....	26.692	27.229	6.407	....	....	....	2135	2135	2402	2536	2936	3337
10.750	104.0	8.830	0.960	11.732	....	29.526	30.116	6.940	....	....	....	2362	2362	2657	2805	3248	3691
10.750	115.0	8.682	1.050	11.690	....	30.190	30.765	6.407	....	....	....	2415	2415	2717	2868	3321	3774
10.750	110.2	8.650	1.050	11.868	....	31.997	32.640	6.940	....	....	....	2560	2560	2880	3040	3520	4000
11.750	84.2	10.350	0.700	12.657	....	24.300	24.785	6.407	....	....	....	1944	1944	2187	2309	2673	3038
11.750	101.0	10.050	0.850	12.901	....	29.107	29.692	6.407	....	....	....	2329	2329	2620	2765	3202	3638
14.000	87.3	12.800	0.600	14.749	....	25.258	25.764	6.407	....	....	....	2021	2021	2273	2400	2778	3157
14.000	94.4	12.700	0.650	14.837	....	27.261	27.804	6.407	....	....	....	2181	2181	2453	2590	2999	3408
14.000	101.4	12.600	0.700	14.924	....	29.248	29.828	6.407	....	....	....	2340	2340	2632	2779	3217	3656
14.000	108.2	12.500	0.750	15.009	....	31.220	31.846	6.407	....	....	....	2498	2498	2810	2966	3434	3903
14.000	115.1	12.400	0.800	15.094	....	33.175	33.838	6.407	....	....	....	2654	2654	2986	3152	3649	4147
14.000	121.8	12.300	0.850	15.177	....	35.115	35.813	6.407	....	....	....	2809	2809	3160	3336	3863	4389



VAM PRO is a highly versatile threaded and coupled premium connection gas-tight sealing of casing in medium to deep wells. This connection was specifically designed to enhance rig operating costs by maximizing ease of handling and reducing running time.

VAM Group*—VAM PRO

Type: Coupled **Seal: Metal-to-metal**

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	13.0	4.369	0.253	5.583	....	3.773	5.698	3.800	....	208	208	302	302	340	358	415	....
5.000	15.0	4.283	0.296	5.583	....	4.374	5.698	3.800	....	241	241	350	350	394	416	481	....
5.000	18.0	4.151	0.362	5.583	....	5.275	5.698	3.800	....	290	290	422	422	475	501	580	....
5.000	20.3	4.059	0.408	5.583	....	5.886	5.698	3.800	....	313	313	456	456	513	541	627	....
5.000	20.8	4.031	0.422	5.583	....	6.069	5.698	3.800	....	313	313	456	456	513	541	627	....
5.000	21.4	4.001	0.437	5.583	....	6.264	5.698	3.800	....	313	313	456	456	513	541	627	....
5.000	23.2	3.919	0.478	5.583	....	6.791	6.043	3.672	....	332	332	483	483	544	574	665	....
5.000	24.1	3.875	0.500	5.583	....	7.069	6.043	3.672	....	332	332	483	483	544	574	665	....
5.500	14.0	4.887	0.244	6.070	....	4.029	6.073	3.734	....	222	222	322	322	363	383	443	....
5.500	15.5	4.825	0.275	6.070	....	4.514	6.073	3.734	....	248	248	361	361	406	429	497	....
5.500	17.0	4.767	0.304	6.070	....	4.962	6.073	3.734	....	273	273	397	397	447	471	546	....
5.500	20.0	4.653	0.361	6.070	....	5.828	6.073	3.734	....	321	321	466	466	525	554	641	....
5.500	23.0	4.545	0.415	6.070	....	6.630	6.073	3.734	....	334	334	486	486	547	577	668	....
5.500	26.0	4.423	0.476	6.070	....	7.513	6.656	3.858	....	366	366	532	532	599	632	732	....
5.500	28.4	4.315	0.530	6.070	....	8.275	6.656	3.858	....	366	366	532	532	599	632	732	....
5.500	29.7	4.251	0.562	6.070	....	8.718	6.656	3.858	....	366	366	532	532	599	632	732	....
6.625	20.0	5.924	0.288	7.410	....	5.734	9.881	3.914	....	315	315	459	459	516	545	631	....
6.625	23.2	5.840	0.330	7.410	....	6.526	9.881	3.914	....	359	359	522	522	587	620	718	....
6.625	24.0	5.796	0.352	7.410	....	6.937	9.881	3.914	....	382	382	555	555	624	659	763	....
6.625	28.0	5.666	0.417	7.410	....	8.133	9.881	3.914	....	447	447	651	651	732	773	895	....
6.625	32.0	5.550	0.475	7.410	....	9.177	9.881	3.914	....	505	505	734	734	826	872	1009	....
6.625	35.0	5.450	0.525	7.410	....	10.061	10.732	4.152	....	553	553	805	805	905	956	1107	....
6.625	41.0	5.250	0.625	7.410	....	11.781	10.732	4.152	....	590	590	859	859	966	1020	1181	....
6.625	43.0	5.180	0.660	7.410	....	12.368	10.732	4.152	....	590	590	859	859	966	1020	1181	....
7.000	20.0	6.331	0.272	7.677	....	5.749	9.274	4.109	....	316	316	460	460	517	546	632	....
7.000	23.0	6.241	0.317	7.677	....	6.655	9.274	4.109	....	366	366	532	532	599	632	732	....
7.000	24.8	6.189	0.343	7.677	....	7.173	9.274	4.109	....	395	395	574	574	646	681	789	....
7.000	26.0	6.151	0.362	7.677	....	7.549	9.274	4.109	....	415	415	604	604	679	717	830	....
7.000	29.0	6.059	0.408	7.677	....	8.449	9.274	4.109	....	465	465	676	676	760	803	929	....
7.000	32.0	5.969	0.453	7.677	....	9.317	9.274	4.109	....	510	510	742	742	835	881	1020	....
7.000	35.0	5.879	0.498	7.677	....	10.172	9.274	4.109	....	510	510	742	742	835	881	1020	....
7.000	38.0	5.795	0.540	7.677	....	10.959	9.274	4.109	....	510	510	742	742	835	881	1020	....
7.000	41.0	5.695	0.590	7.677	....	11.881	10.039	4.182	....	552	552	803	803	904	954	1104	....
7.000	44.0	5.595	0.640	7.677	....	12.788	10.039	4.182	....	552	552	803	803	904	954	1104	....
7.000	46.0	5.535	0.670	7.677	....	13.324	10.039	4.182	....	552	552	803	803	904	954	1104	....
7.625	26.4	6.844	0.328	8.520	....	7.519	13.006	4.174	....	414	414	602	602	677	714	827	....
7.625	29.7	6.750	0.375	8.520	....	8.541	13.006	4.174	....	470	470	683	683	769	811	940	....
7.625	33.7	6.640	0.430	8.520	....	9.720	13.006	4.174	....	535	535	778	778	875	923	1069	....
7.625	35.8	6.570	0.465	8.520	....	10.460	13.006	4.174	....	575	575	837	837	941	994	1151	....
7.625	39.0	6.500	0.500	8.520	....	11.192	13.006	4.174	....	616	616	895	895	1007	1063	1231	....
7.625	42.8	6.376	0.562	8.520	....	12.470	13.006	4.174	....	686	686	998	998	1122	1185	1372	....
7.625	45.3	6.310	0.595	8.520	....	13.141	14.147	4.498	....	723	723	1051	1051	1183	1248	1446	....
7.625	47.1	6.250	0.625	8.520	....	13.744	14.147	4.498	....	756	756	1100	1100	1237	1306	1512	....
7.625	52.8	6.076	0.712	8.520	....	15.463	14.147	4.498	....	778	778	1132	1132	1273	1344	1556	....
7.625	57.3	5.950	0.775	8.520	....	16.678	14.147	4.498	....	778	778	1132	1132	1273	1344	1556	....
8.625	28.0	7.892	0.304	9.626	....	7.947	16.439	3.853	....	437	437	636	636	715	755	874	....
8.625	32.0	7.796	0.352	9.626	....	9.149	16.439	3.853	....	503	503	732	732	823	869	1006	....
8.625	36.0	7.700	0.400	9.626	....	10.336	16.439	3.853	....	568	568	827	827	930	982	1137	....
8.625	40.0	7.600	0.450	9.626	....	11.557	16.439	3.853	....	636	636	925	925	1040	1098	1271	....
8.625	44.0	7.500	0.500	9.626	....	12.763	16.439	3.853	....	702	702	1021	1021	1149	1212	1404	....

Table continues

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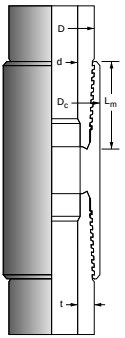
VAM Group—VAM PRO (continued)

									Minimum joint tension strength, kips							
D	w	d	t	D_c	D_{sc}	A_s	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
8.625	49.0	7.386	0.557	9.626	....	14.118	17.407	3.852	....	776	776	1129	1129	1271	1341	1553	....
8.625	52.0	7.310	0.595	9.626	....	15.010	17.407	3.852	....	826	826	1201	1201	1351	1426	1651	....
8.625	36.0	8.765	0.352	10.626	....	10.254	18.679	4.138	....	564	564	820	820	923	974	1128	....
8.625	40.0	8.679	0.395	10.626	....	11.454	18.679	4.138	....	630	630	916	916	1031	1088	1260	....
8.625	43.5	8.599	0.435	10.626	....	12.559	18.679	4.138	....	691	691	1005	1005	1130	1193	1381	....
8.625	47.0	8.525	0.472	10.626	....	13.572	18.679	4.138	....	746	746	1086	1086	1221	1289	1493	....
8.625	53.5	8.379	0.545	10.626	....	15.546	18.679	4.138	....	855	855	1244	1244	1399	1477	1710	....
8.625	58.4	8.279	0.595	10.626	....	16.879	18.679	4.138	....	928	928	1350	1350	1519	1604	1857	....
8.625	59.4	8.251	0.609	10.626	....	17.250	20.193	4.318	....	949	949	1380	1380	1553	1639	1898	....
8.625	61.1	8.219	0.625	10.626	....	17.671	20.193	4.318	....	972	972	1414	1414	1590	1679	1944	....
8.625	64.9	8.125	0.672	10.626	....	18.901	20.193	4.318	....	1040	1040	1512	1512	1701	1796	2079	....
8.625	70.3	8.001	0.734	10.626	....	20.502	20.193	4.318	....	1111	1111	1615	1615	1817	1918	2221	....
8.625	71.8	7.969	0.750	10.626	....	20.911	20.193	4.318	....	1111	1111	1615	1615	1817	1918	2221	....
9.875	62.8	8.469	0.625	10.626	....	18.162	16.308	4.228	....	897	897	1305	1305	1468	1549	1794	....
9.875	66.4	8.397	0.661	10.626	....	19.134	16.308	4.228	....	897	897	1305	1305	1468	1549	1794	....
9.875	67.5	8.363	0.678	10.626	....	19.590	16.308	4.228	....	897	897	1305	1305	1468	1549	1794	....
9.875	68.9	8.319	0.700	10.626	....	20.177	16.308	4.228	....	897	897	1305	1305	1468	1549	1794	....
9.875	70.5	8.279	0.720	10.626	....	20.708	16.308	4.228	....	897	897	1305	1305	1468	1549	1794	....

VAM Group*—VAM SL

Type: Coupled Seal: Metal-to-metal

									Minimum joint tension strength, kips							
D	w	d	t	D_c	D_{sc}	A_s	A_c	L_m	H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	23.2	4.044	0.478	5.256	....	6.791	5.454	4.835	....	300	300	436	436	491	518	600	682
5.000	24.1	4.000	0.500	5.295	....	7.069	5.782	4.835	....	318	318	463	463	520	549	636	723
5.000	26.7	3.876	0.562	5.315	....	7.836	5.946	4.835	....	327	327	476	476	535	565	654	743
5.000	29.2	3.750	0.625	5.236	....	8.590	6.845	5.864	....	376	376	548	548	616	650	753	856
5.000	31.6	3.626	0.687	5.315	....	9.309	7.497	5.864	....	412	412	600	600	675	712	825	937
5.000	34.0	3.500	0.750	5.354	....	10.014	7.828	5.864	....	431	431	626	626	705	744	861	979
5.500	26.0	4.548	0.476	5.787	....	7.513	6.245	4.882	....	343	343	500	500	562	593	687	781
5.500	26.8	4.500	0.500	5.787	....	7.854	6.245	4.882	....	343	343	500	500	562	593	687	781
5.500	29.7	4.376	0.562	5.846	....	8.718	6.784	4.882	....	373	373	543	543	611	644	746	848
5.500	32.6	4.250	0.625	5.787	....	9.572	8.153	6.358	....	448	448	652	652	734	775	897	1019
5.500	35.3	4.126	0.687	5.827	....	10.388	8.513	6.358	....	468	468	681	681	766	809	936	1064
5.500	38.0	4.000	0.750	5.866	....	11.192	8.874	6.358	....	488	488	710	710	799	843	976	1109
5.500	40.5	3.876	0.812	5.866	....	11.959	8.874	6.358	....	488	488	710	710	799	843	976	1109
6.625	32.0	5.675	0.475	6.949	....	9.177	7.443	4.772	....	409	409	595	595	670	707	819	930
6.625	33.0	5.625	0.500	6.988	....	9.621	7.874	4.772	....	433	433	630	630	709	748	866	984
6.625	34.5	5.575	0.525	7.008	....	10.061	8.091	4.772	....	445	445	647	647	728	769	890	1011
6.625	36.7	5.501	0.562	7.047	....	10.705	8.525	4.772	....	469	469	682	682	767	810	938	1066
6.625	40.2	5.375	0.625	6.909	....	11.781	9.492	5.768	....	522	522	759	759	854	902	1044	1187
6.625	43.7	5.251	0.687	7.008	....	12.816	10.568	5.768	....	581	581	845	845	951	1004	1162	1321
6.625	47.1	5.125	0.750	7.067	....	13.843	11.220	5.768	....	617	617	898	898	1010	1066	1234	1403
6.625	50.4	5.001	0.812	7.087	....	14.829	11.439	5.768	....	629	629	915	915	1030	1087	1258	1430
7.000	35.0	6.004	0.498	7.323	....	10.172	8.475	5.362	....	466	466	678	678	763	805	932	1059
7.000	38.0	5.920	0.540	7.362	....	10.959	8.930	5.362	....	491	491	714	714	804	848	982	1116
7.000	41.0	5.820	0.590	7.441	....	11.881	9.846	5.362	....	542	542	788	788	886	935	1083	1231
7.000	42.7	5.750	0.625	7.480	....	12.517	10.306	5.362	....	567	567	824	824	928	979	1134	1288
7.000	45.4	5.660	0.670	7.323	....	13.324	10.985	6.163	....	604	604	879	879	989	1044	1208	1373
7.000	46.4	5.626	0.687	7.362	....	13.625	11.439	6.163	....	629	629	915	915	1030	1087	1258	1430
7.000	49.5	5.540	0.730	7.402	....	14.379	11.896	6.163	....	654	654	952	952	1071	1130	1309	1487
7.000	50.1	5.500	0.750	7.402	....	14.726	11.896	6.163	....	654	654	952	952	1071	1130	1309	1487
7.000	53.6	5.376	0.812	7.480	....	15.785	12.817	6.163	....	705	705	1025	1025	1154	1218	1410	1602
7.625	33.7	6.795	0.438	8.031	....	9.720	7.939	4.682	....	437	437	635	635	715	754	873	992
7.625	39.0	6.625	0.500	7.992	....	11.192	9.728	5.827	....	535	535	778	778	876	924	1070	1216
7.625	42.8	6.501	0.562	8.031	....	12.470	10.224	5.827	....	562	562	818	818	920	971	1125	1278
7.625	45.3	6.435	0.595	8.071	....	13.141	10.721	5.827	....	590	590	858	858	965	1018	1179	1340
7.625	47.1	6.375	0.625	8.091	....	13.744	10.972	5.827	....	603	603	878	878	987	1042	1207	1372
7.625	51.2	6.251	0.687	7.953	....	14.974	13.321	6.732	....	733	733	1066	1066	1199	1265	1465	1665
7.625	52.8	6.201	0.712	7.953	....	15.463	13.321	6.732	....	733	733	1066	1066	1199	1265	1465	1665
7.625	55.3	6.125	0.750	7.992	....	16.199	13.815	6.732	....	760	760	1105	1105	1243	1312	1520	1727
7.625	59.2	6.001	0.812	8.031	....	17.380	14.310	6.732	....	787	787	1145	1145	1288	1359	1574	1789
7.625	63.2	5.875	0.875	8.071	....	18.555	14.807	6.732	....	814	814	1185	1185	1333	1407	1629	1851
7.750	46.1	6.560	0.595	8.091	....	13.374	10.898	6.079	....	599	599	872	872	981	1035	1199	1362
7.750	48.6	6.470	0.640	8.150	....	14.296	11.651	6.079	....	641	641	932	932	1049	1107	1282	1456
7.750	51.8	6.376	0.687	8.189	....	15.244	12.157	6.079	....	669	669	973	973	1094	1155	1337	1520
7.750	56.1	6.250	0.750	8.228	....	16.493	12.664	6.079	....	697	697	1013	1013	1140	1203	1393	1583
8.625	44.0	7.825	0.500	8.976	....	12.763	10.573	5.248	....	582	582	846	846	952	1004	1163	1322
8.625	49.0	7.511	0.557	9.055	....	14.118	11.687	5.248	....	643	643	935	935	1052	1110	1286	1461
8.625	52.0	7.501	0.562	9.055	....	14.236	11.687	5.248	....	643	643	935	935	1052	1110	1286	1461
8.625	54.0	7.375	0.625	9.134	....	15.708	12.812	5.248	....	705	705	1025	1025	1153	1217	1409	1602
8.625	58.7	7.251	0.687	9.213	....	17.132	13.947	5.248	....	767	767	1116	1116	1255	1325	1534	1743
8.625	63.5	7.125	0.750	9.114	....	18.555	15.131	6.705	....	832	832	1210	1210	1362	1437	1664	1891
8.625	68.1	7.001	0.812	9.173	....	19.931	15.981	6.705	....	879	879	1278	1278	1438	1518	1758	1998
8.625	72.7	6.875	0.875	9.213	....	21.304	16.548	6.705	....	910	910	1324	1324	1489	1572	1820	2069
9.625	47.0	8.681	0.472	10.020	....	13.572	10.955	5.315	....	603	603	876	876	986	1041	1205	1369
9.625	53.5	8.535	0.545	10.118	....	15.546	12.512	5.315	....	688	688	1001	1001	1126	1189	1376	1564
9.625	59.4	8.407	0.609	10.236	....	17.250	14.400	5.315	....	792	792	1152	1152	1296	1368	1584	1800
9.625	64.9	8.281	0.672	10.295	....	18.901	15.353	5.315	....	844	844	1228	1228	1382	1459	1689	1919
9.625	70.3	8.157	0.734	10.079	....	20.502	16.521	6.522	....	909	909	1322	1322	1487	1569	1817	2065
9.625	75.6	8.031	0.797	10.157	....	22.104	17.772	6.522	....	977	977	1422	1422	1599	1688	1955	2222
9.625	80.8	7.907	0.859	10.236	....	23.656	19.034	6.522	....	1047	1047	1523	1523	1713	1808	2094	2379
9.625	86.0	7.781	0.922	10.295	....	25.209	19.986	6.522	....	1099	1099	1599	1599	1799	1899	2198	2498
9.875	62.8	8.625	0.625	10.315	....	18.162	14.637	5.736	....	805	805	1171	1171	1317	1391	1610	1830
9.875	68.9	8.475	0.700	10.469	....	20.127	17.143	5.736	....	943	943	1371	1371	1543	1629	1886	2143
10.000	60.7	8.624	0.688	10.413	....	20.177	16.239	6.720	....	893	893	1299	1299	1462	1543	1786	2030
10.750	60.7	9.660	0.545	11.260	....	17.473	15.057	6.732	....	828	828	1205	1205	1355	1430	1656	1882
10.750	65.7	9.560	0.595	11.299	....	18.982	15.754	6.732	....	866	866	1260	1260	1418	1497	1733	1969
10.750	73.2	9.406	0.672	11.378	....	21.276	17.157	6.732	....	944	944	1373	1373	1544	1630	1887	2145
10.750	79.2	9.282	0.734	11.299	....	23.096	19.389	6.732	....	1066	1066	1551	1551	1745	1842	2133	2424
10.750	85.3	9.156	0.797	11.339	....	24.921	20.090	6.732	....	1105	1105	1607	1607	1808	1909	2210	2511
10.750	91.2	9.032	0.859	11.417	....	26.692	21.497	6.732	....	1182	1182	1720	1720	1935	2042	2365	2687
10.750	97.1	8.906	0.922	11.417	....	28.467	21.497	6.732	....	1182	1182	1720	1720	1935	2042	2365	2687
10.750	100.4	8.830	0.960	11.693	....	29.526	26.499	6.732	....	1457	1457	2120	2120	2385	2517	2915	3312
11.750	65.0	10.682	0.534	12.283	....	18.816	15.466	5.811	....	851	851	1237	1237	1392	1469	1701	1933
11.750	71.0	10.586	0.582	12.362	....	20.420	16.990	5.811	....	934	934	1359	1359	1529	1614	1869	2124
11.750	75.0	10.530	0.610	12.382	....	21.348	17.372	5.811	....	955	955	1390	1390	1563	1650	1911	2172
11.750	79.0	10.478	0.636	12.402	....	22.206	17.755	5.811	....	977	977	1420	1420	1598	1687	1953	2219



VAM SL is designed for deep, high pressure wells where controlled-yield materials are needed. It is suitable for intermediate, liner and production tie-back casing, where running clearance is critical and features metal-to-metal seals and hook threads with –9° load flanks to prevent jump-out under tension.

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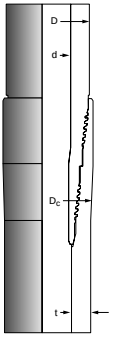
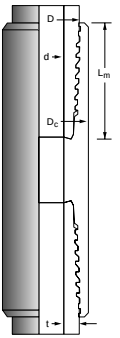


VAM SLIJ combines a near-flush OD with high-tensile efficiencies. The connection is especially suited for production and intermediate casing, drilling liner and high-pressure tie-back applications, deviated or horizontal and high-temperature wells. It features metal-to-metal seals, hooked threads and deep stabbing with no cross threading.



VAM TOP provides tubing performance in casing sizes. New steep taper metal-to-metal seal design ensures gas-tight pressure integrity for large-OD tubing and production casing strings, even under severe mechanical and thermal combine loads. It is suitable for all types of materials (carbon and CRA) and ideal for horizontal or deviated wells.

VAM TOP HT has the same design and performance as the VAM TOP except for an enhanced torque shoulder. This design is ideal for applications where high torque is anticipated, such as rotation during cementing operations or tight running in deviated and horizontal wells.

VAM Group*—VAM SLIJ

Type: Coupled Seal: Metal-to-metal

D	w	d	t	D_c	D_{sc}	A_j	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	18.0	4.151	0.362	5.113	....	5.275	3.824	4.447	....	....	....	306	306	344	363	421	478
5.000	20.3	4.059	0.408	5.113	....	5.886	4.422	4.537	....	....	....	354	354	398	420	486	553
5.000	20.8	4.031	0.422	5.113	....	6.069	4.602	4.557	....	....	....	368	368	414	437	506	575
5.000	21.4	4.001	0.437	5.113	....	6.264	4.791	4.578	....	....	....	383	383	431	455	527	599
5.000	23.2	3.919	0.478	5.113	....	6.791	5.307	4.897	....	....	....	425	425	478	504	584	663
5.000	24.1	3.875	0.500	5.113	....	7.069	5.552	5.325	....	....	....	444	444	500	527	611	694
5.000	26.7	3.751	0.562	5.127	....	7.836	6.256	5.647	....	....	....	500	500	563	594	688	782
5.000	29.2	3.625	0.625	5.146	....	8.590	6.859	6.061	....	....	....	549	549	617	652	754	857
5.500	20.0	4.653	0.361	5.618	....	5.828	4.177	4.240	....	....	....	334	334	376	397	459	522
5.500	23.0	4.545	0.415	5.624	....	6.630	4.954	4.533	....	....	....	396	396	446	471	545	619
5.500	23.8	4.501	0.437	5.624	....	6.951	5.267	4.564	....	....	....	421	421	474	500	579	658
5.500	26.0	4.423	0.476	5.624	....	7.513	5.577	4.842	....	....	....	446	446	502	530	613	697
5.500	26.8	4.375	0.500	5.624	....	7.854	6.118	5.313	....	....	....	489	489	551	581	673	765
5.500	28.4	4.315	0.530	5.624	....	8.275	6.527	5.354	....	....	....	522	522	587	620	718	816
5.500	29.7	4.251	0.562	5.626	....	8.718	6.932	5.618	....	....	....	555	555	624	659	763	867
5.500	32.0	4.151	0.612	5.641	....	9.398	7.488	5.997	....	....	....	599	599	674	711	824	936
5.500	32.6	4.125	0.625	5.645	....	9.572	7.581	6.002	....	....	....	606	606	682	720	834	948
6.625	28.0	5.666	0.417	6.747	....	8.133	5.954	4.523	....	....	....	476	476	536	566	655	744
6.625	32.0	5.550	0.475	6.770	....	9.177	7.012	4.771	....	....	....	561	561	631	666	771	877
6.625	33.0	5.500	0.500	6.774	....	9.621	7.440	4.912	....	....	....	595	595	670	707	818	930
6.625	34.5	5.450	0.525	6.774	....	10.061	7.871	5.247	....	....	....	630	630	708	748	866	984
6.625	36.7	5.376	0.562	6.774	....	10.705	8.455	5.587	....	....	....	676	676	761	803	930	1057
6.625	40.2	5.250	0.625	6.774	....	11.781	9.409	6.056	....	....	....	753	753	847	894	1035	1176
6.625	43.7	5.126	0.687	6.786	....	12.816	10.283	6.498	....	....	....	823	823	925	977	1131	1285
7.000	26.0	6.151	0.362	7.157	....	7.549	5.273	4.214	....	....	....	422	422	475	501	580	659
7.000	29.0	6.059	0.408	7.157	....	8.449	6.121	4.507	....	....	....	490	490	551	581	673	765
7.000	32.0	5.969	0.453	7.157	....	9.317	6.969	4.570	....	....	....	558	558	627	662	767	871
7.000	35.0	5.879	0.498	7.157	....	10.172	7.815	4.867	....	....	....	625	625	703	742	860	977
7.000	38.0	5.795	0.540	7.157	....	10.959	8.314	5.337	....	....	....	665	665	748	790	915	1039
7.000	41.0	5.695	0.590	7.157	....	11.881	9.441	5.709	....	....	....	755	755	850	897	1039	1180
7.000	42.7	5.625	0.625	7.157	....	12.517	10.064	6.101	....	....	....	805	805	906	956	1107	1258
7.000	44.0	5.595	0.640	7.157	....	12.788	10.292	6.157	....	....	....	823	823	926	978	1132	1287
7.000	45.4	5.535	0.670	7.157	....	13.324	10.740	6.472	....	....	....	859	859	967	1020	1181	1343
7.000	46.4	5.501	0.687	7.160	....	13.625	10.960	6.517	....	....	....	877	877	986	1041	1206	1370
7.000	49.5	5.415	0.730	7.173	....	14.379	11.684	6.862	....	....	....	919	919	1034	1091	1263	1436
7.625	29.7	6.750	0.375	7.789	....	8.541	5.971	4.252	....	....	....	478	478	537	567	657	746
7.625	33.7	6.640	0.430	7.793	....	9.720	7.043	4.533	....	....	....	563	563	634	669	775	880
7.625	39.0	6.500	0.500	7.797	....	11.192	8.520	4.822	....	....	....	682	682	767	809	937	1065
7.625	42.8	6.376	0.562	7.797	....	12.470	9.722	5.578	....	....	....	778	778	875	924	1069	1215
7.625	45.3	6.310	0.595	7.797	....	13.141	10.374	5.686	....	....	....	830	830	934	986	1141	1297
7.625	47.1	6.250	0.625	7.797	....	13.744	10.966	6.053	....	....	....	877	877	987	1042	1206	1371
7.625	51.2	6.126	0.687	7.797	....	14.974	12.039	6.514	....	....	....	963	963	1084	1144	1324	1505
7.625	52.1	6.100	0.700	7.797	....	15.229	12.245	6.561	....	....	....	980	980	1102	1163	1347	1531
7.625	52.8	6.076	0.712	7.797	....	15.463	12.431	6.800	....	....	....	994	994	1119	1181	1367	1554
7.750	46.1	6.435	0.595	7.924	....	13.374	10.335	5.691	....	....	....	827	827	930	982	1137	1292
7.750	47.6	6.375	0.625	7.924	....	13.990	11.151	6.046	....	....	....	892	892	1004	1059	1227	1394
7.750	48.6	6.345	0.640	7.924	....	14.296	11.448	6.126	....	....	....	916	916	1030	1088	1259	1431
8.625	36.0	7.700	0.400	8.799	....	10.336	7.339	4.485	....	....	....	587	587	661	697	807	917
8.625	40.0	7.600	0.450	8.819	....	11.557	8.364	4.869	....	....	....	669	669	753	795	920	1046
8.625	44.0	7.500	0.500	8.819	....	12.763	9.526	5.228	....	....	....	762	762	857	905	1048	1191
8.625	49.0	7.386	0.557	8.819	....	14.118	10.839	5.363	....	....	....	867	867	976	1030	1192	1355
8.625	49.1	7.376	0.562	8.819	....	14.236	10.945	5.569	....	....	....	876	876	985	1040	1204	1368
8.625	52.0	7.310	0.595	8.819	....	15.010	11.695	5.615	....	....	....	936	936	1053	1111	1286	1462
8.625	54.0	7.250	0.625	8.819	....	15.708	12.381	5.981	....	....	....	990	990	1114	1176	1362	1548
8.625	58.7	7.126	0.687	8.819	....	17.132	13.711	6.487	....	....	....	1097	1097	1234	1303	1508	1714
8.625	63.5	7.000	0.750	8.819	....	18.555	14.767	6.383	....	....	....	1181	1181	1329	1403	1624	1846
9.625	43.5	8.599	0.435	9.814	....	12.559	8.837	4.772	....	....	....	707	707	795	840	972	1105
9.625	47.0	8.525	0.472	9.813	....	13.572	9.767	4.884	....	....	....	781	781	879	928	1074	1221
9.625	53.5	8.379	0.545	9.842	....	15.546	11.599	5.332	....	....	....	928	928	1044	1102	1276	1450
9.625	58.4	8.279	0.595	9.842	....	16.879	12.992	5.607	....	....	....	1039	1039	1169	1234	1429	1624
9.625	59.4	8.251	0.609	9.842	....	17.250	13.353	5.627	....	....	....	1068	1068	1202	1269	1469	1669
9.625	61.1	8.219	0.625	9.842	....	17.671	13.764	5.709	....	....	....	1101	1101	1239	1308	1514	1721
9.625	64.9	8.125	0.672	9.842	....	18.901	14.951	6.160	....	....	....	1196	1196	1346	1420	1645	1869
9.625	70.3	8.001	0.734	9.842	....	20.502	16.284	6.362	....	....	....	1303	1303	1466	1547	1791	2036
9.625	71.8	7.969	0.750	9.842	....	20.911	16.579	6.379	....	....	....	1326	1326	1492	1575	1824	2072
9.625	75.6	7.875	0.797	9.842	....	22.104	17.681	6.473	....	....	....	1414	1414	1591	1680	1945	2210
9.625	75.9	7.869	0.800	9.842	....	22.180	17.758	6.853	....	....	....	1421	1421	1598	1687	1953	2220
9.750	59.2	8.404	0.595	9.969	....	17.113	13.155	5.606	....	....	....	1052	1052	1184	1250	1447	1644
9.875	62.8	8.469	0.625	10.097	....	18.162	14.110	5.692	....	....	....	1129	1129	1270	1340	1552	1764
10.000	67.2	8.500	0.672	10.225	....	19.693	15.522	6.135	....	....	....	1242	1242	1397	1475	1707	1940
10.000	68.7	8.468	0.688	10.225	....	20.127	15.943	6.424	....	....	....	1275	1275	1435	1515	1754	1993
10.750	51.0	9.694	0.450	10.944	....	14.561	10.177	4.794	....	....	....	814	814	916	967	1119	1272
10.750	55.5	9.604	0.495	10.947	....	15.947	11.433	4.935	....	....	....	915	915	1029	1086	1258	1429
10.750	60.7	9.504	0.545	10.972	....	17.473	12.967	5.329	....	....	....	1037	1037	1167	1232	1426	1621
10.750	65.7	9.404	0.595	10.992	....	18.982	14.418	5.672	....	....	....	1153	1153	1298	1370	1586	1802
10.750	71.1	9.294	0.650	10.992	....	20.625	16.005	5.765	....	....	....	1280	1280	1440	1520	1761	2001
10.750	73.2	9.250	0.672	10.992	....	21.276	16.633	6.082	....	....	....	1331	1331	1497	1580	1830	2079
10.750	75.9	9.194	0.700	10.992	....	22.101	17.427	6.432	....	....	....	1394	1394	1568	1656	1917	2178
10.750	79.2	9.126	0.734	10.992	....	23.096	18.264	6.558	....	....	....	1461	1461	1644	1735	2009	2283
10.750	80.8	9.094	0.750	10.992	....	23.562	18.716	6.380	....	....	....	1497	1497	1684	1778	2059	2340
10.750	85.3	9.000	0.797	10.992	....	24.921	20.029	6.507	....	....	....	1602	1602	1803	1903	2203	2504
11.750	54.0	10.724	0.435	11.933	....	15.463	10.478	4.476	....	....	....	838	838	943	995	1153	1310
11.750	60.0	10.616	0.489	11.941	....	17.300	12.070	4.872	....	....	....	966	966	1086	1147	1328	1509
11.750	65.0	10.526	0.534	11.963	....	18.816	13.625	5.209	....	....	....	1090	1090	1226	1294	1499	1703
11.750	71.0	10.430	0.582	11.983	....	20.420	15.196	5.572	....	....	....	1216	1216	1368	1444	1672	1900
11.750	74.6	10.358	0.618	12.001	....	21.613	16.377	5.622	....	....	....	1310	1310	1474	1556	1801	2047
11.750	75.4	10.344	0.625	12.005	....	21.844	16.599	5.631	....	....	....	1328	1328	1494	1577	1826	2075
11.750	78.8	10.282	0.656	12.015	....	22.863	17.568	5.728	....	....	....	1405	1405	1581	1669	1932	2196
11.750	80.5	10.250	0.672	12.015	....	23.387	18.081	6.013	....	....	....	1446	1446	1627	1718	1989	2260
11.750	82.6	10.212	0.691	12.015	....	24.007	18.673	6.113	....	....	....	1494	1494	1681	1774	2054	2334
11.750	87.4	10.126	0.734	12.015	....	25.402	20.014	6.540	....	....	....	1601	1601	1801	1901	2202	2502
11.875	71.8	10.555	0.582	12.108	....	20.648	15.337	5.571	....	....	....	1227	1227	1380	1457	1687	1917

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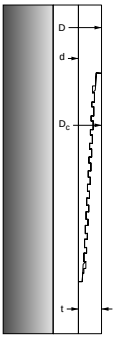
VAM Group—VAM TOP/VAM TOP HT

Type: Coupled Seal: Metal-to-metal

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125
5.000	15.0	4.408	0.296	5.470	5.358	4.374	4.462	4.191	....	241	241	350	350	394	416	481	547
5.000	18.0	4.276	0.362	5.577	5.443	5.275	5.385	4.191	....	290	290	422	422	475	501	580	659
5.000	20.3	4.184	0.408	5.648	5.500	5.886	6.009	4.191	....	324	324	471	471	530	559	647	736
5.000	20.8	4.156	0.422	5.669	5.518	6.069	6.202	4.191	....	334	334	486	486	546	577	668	759
5.000	21.4	4.126	0.437	5.691	5.535	6.264	6.395	4.191	....	345	345	501	501	564	595	689	783
5.000	23.2	4.044	0.478	5.750	5.583	6.791	6.925	4.191	....	374	374	543	543	611	645	747	849
5.500	15.5	4.950	0.275	5.929	5.821	4.514	4.608	4.382	....	248	248	361	361	406	429	497	564
5.500	17.0	4.892	0.304	5.978	5.860	4.962	5.069	4.382	....	273	273	397	397	447	471	546	620
5.500	20.0	4.778	0.361	6.071	5.935	5.828	5.944	4.382	....	321	321	466	466	525	554	641	729
5.500	23.0	4.670	0.415	6.156	6.004	6.630	6.756	4.382	....	365	365	530	530	597	630	729	829
5.500	26.0	4.548	0.476	6.248	6.079	7.513	7.659	4.382	....	413	413	601	601	676	714	826	939
6.625	20.0	6.049	0.288	7.081	6.967	5.734	5.845	4.427	....	315	315	459	459	516	545	631	717
6.625	23.2	5.965	0.330	7.154	7.026	6.526	6.659	4.427	....	359	359	522	522	587	620	718	816
6.625	24.0	5.921	0.352	7.191	7.055	6.937	7.080	4.427	....	382	382	555	555	624	659	763	867
6.625	28.0	5.791	0.417	7.297	7.140	8.133	8.289	4.427	....	447	447	651	651	732	773	895	1017
7.000	23.0	6.366	0.317	7.488	7.364	6.655	6.786	4.476	....	366	366	532	532	599	632	732	832
7.000	26.0	6.276	0.362	7.565	7.425	7.549	7.693	4.476	....	415	415	604	604	676	717	830	944
7.000	29.0	6.184	0.408	7.644	7.486	8.449	8.634	4.476	....	465	465	676	676	760	803	929	1056
7.000	32.0	6.094	0.453	7.717	7.545	9.317	9.512	4.476	....	512	512	745	745	839	885	1025	1165
7.000	35.0	6.004	0.498	7.787	7.602	10.172	10.376	4.476	....	559	559	814	814	915	966	1119	1272
7.000	38.0	5.920	0.540	7.852	7.656	10.959	11.172	4.476	....	603	603	877	877	986	1041	1205	1370
7.000	41.0	5.820	0.590	7.929	7.717	11.881	12.124	4.476	....	653	653	950	950	1069	1129	1307	1485
7.625	29.7	6.875	0.375	8.213	8.067	8.541	8.716	4.868	....	470	470	683	683	769	811	940	1068
7.625	33.7	6.795	0.430	8.305	8.140	9.720	9.917	4.868	....	535	535	778	778	875	923	1069	1215
7.625	35.8	6.695	0.465	8.362	8.187	10.460	10.664	4.868	....	575	575	837	837	941	994	1151	1308
7.625	39.0	6.625	0.500	8.419	8.232	11.192	11.416	4.868	....	616	616	895	895	1007	1063	1231	1399
7.750	46.1	6.560	0.595	8.693	8.476	13.374	13.642	4.915	....	736	736	1070	1070	1204	1271	1471	1672
8.625	36.0	7.825	0.400	9.266	9.108	10.336	10.560	5.604	....	568	568	827	827	930	982	1137	1292
8.625	40.0	7.725	0.450	9.350	9.175	11.557	11.797	5.604	....	636	636	925	925	1040	1098	1271	1445
8.625	44.0	7.625	0.500	9.433	9.242	12.763	13.017	5.604	....	702	702	1021	1021	1149	1212	1404	1595
8.625	49.0	7.511	0.557	9.526	9.317	14.118	14.395	5.604	....	776	776	1129	1129	1271	1341	1553	1765
8.625	52.0	7.435	0.595	9.587	9.366	15.010	15.311	5.604	....	826	826	1201	1201	1351	1426	1651	1876
9.625	40.0	8.835	0.395	10.264	10.106	11.454	11.699	5.589	....	630	630	916	916	1031	1088	1260	1432
9.625	43.5	8.755	0.435	10.333	10.161	12.559	12.814	5.589	....	691	691	1005	1005	1130	1193	1381	1570
9.625	47.0	8.681	0.472	10.396	10.213	13.572	13.838	5.589	....	746	746	1086	1086	1221	1289	1493	1697
9.625	53.5	8.535	0.545	10.520	10.311	15.546	15.877	5.589	....	855	855	1244	1244	1399	1477	1710	1943
9.625	58.4	8.435	0.595	10.600	10.376	16.879	17.214	5.589	....	928	928	1350	1350	1519	1604	1857	2110
9.875	62.8	8.625	0.625	10.907	10.673	18.162	18.518	5.484	....	999	999	1453	1453	1635	1725	1998	2270
10.750	45.5	9.950	0.400	11.400	11.238	13.006	13.273	5.634	....	715	715	1040	1040	1171	1236	1431	1626
10.750	51.0	9.850	0.450	11.488	11.309	14.561	14.865	5.634	....	801	801	1165	1165	1310	1383	1602	1820
10.750	55.5	9.760	0.495	11.565	11.372	15.947	16.255	5.634	....	877	877	1276	1276	1435	1515	1754	1993
10.750	60.7	9.660	0.545	11.652	11.439	17.473	17.834	5.634	....	961	961	1398	1398	1573	1660	1922	2184
10.750	65.7	9.560	0.595	11.734	11.506	18.982	19.353	5.634	....	1044	1044	1519	1519	1708	1803	2088	2373
11.750	54.0	10.880	0.435	12.463	12.287	15.463	15.796	5.713	....	850	850	1237	1237	1392	1469	1701	1933
11.750	60.0	10.772	0.489	12.557	12.362	17.300	17.653	5.713	....	952	952	1384	1384	1557	1644	1903	2163
11.750	65.0	10.682	0.534	12.636	12.425	18.816	19.211	5.713	....	1035	1035	1505	1505	1693	1788	2070	2352
13.375	61.0	12.515	0.430	14.085	13.909	17.487	17.842	5.698	....	962	962	1399	1399	1574	1661	1924	2186
13.375	68.0	12.415	0.480	14.175	13.982	19.445	19.851	5.698	....	1069	1069	1556	1556	1750	1847	2139	2431
13.375	72.0	12.347	0.514	14.236	14.030	20.768	21.213	5.698	....	1142	1142	1661	1661	1869	1973	2284	2596
13.375	77.0	12.275	0.550	14.299	14.081	22.160	22.625	5.698	....	1219	1219	1773	1773	1994	2105	2438	2770
13.375	80.7	12.215	0.580	14.350	14.122	23.314	23.777	5.698	....	1282	1282	1865	1865	2098	2215	2565	2914
13.375	85.0	12.159	0.608	14.400	14.161	24.386	24.888	5.698	....	1341	1341	1951	1951	2195	2317	2682	3048
13.375	86.0	12.125	0.625	14.429	14.183	25.035	25.556	5.698	....	1377	1377	2003	2003	2253	2378	2754	3129

*** Includes: Sumitomo Metal Industries, Ltd./Tubular Industries Scotland Ltd./Vallourec Oil & Gas/VAM PTS**



XL SYSTEMS, INC., XLF is a high-strength integral connection machined directly on the tube. The connection is internal/external flush utilizing wedge thread technology and dovetail flanks. Applications include slim hole drilling, drive pipe, surface casing, jet strings, tiebacks, platform conductors,and pipelines.

XL SYSTEMS, INC., XLC caisson thread is based on the proven XLF design concept. Primary applications are tubular strings that require increased fatigue life, including conductors and tiebacks in extreme environments, free-standing caissons, and compliant structures.

XL Systems, Inc.—XLF

Type: Integral, flush Seal: Metal-to-metal

D	w	d	t	D_c	D_{sc}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125	Grade B	X-42	X-46	X-52	X-56
20.0	91.5	19.124	0.438	20.0	20.0	26.918	15.021	3.414	801	826	826	1202	1202	1352	1427	1652	1878	526	631	691	781	841
20.0	104.1	19.000	0.500	20.0	20.0	30.631	15.879	4.766	635	873	873	1270	1270	1429	1509	1747	1985	556	667	730	826	889
20.0	129.3	18.750	0.625	20.0	20.0	38.043	20.082	4.747	803	1105	1105	1607	1607	1807	1908	2209	2510	703	843	924	1044	1125
20.0	131.3	18.730	0.635	20.0	20.0	38.631	20.082	4.747	803	1105	1105	1607	1607	1807	1908	2209	2510	703	843	924	1044	1125
20.0	154.2	18.500	0.750	20.0	20.0	45.357	25.076	6.016	1003	1379	1379	2006	2006	2257	2382	2758	3135	878	1053	1153	1304	1404
20.0	166.4	18.376	0.812	20.0	20.0	48.948	25.076	6.016	1003	1379	1379	2006	2006	2257	2382	2758	3135	878	1053	1153	1304	1404
20.0	202.9	18.000	1.000	20.0	20.0	59.690	33.455	10.077	1338	1840	1840	2676	2676	3011	3178	3680	4182	1171	1405	1539	1740	1873
20.0	250.3	17.500	1.250	20.0	20.0	73.631	50.994	10.800	2040	2805	2805	4080	4080	4589	4844	5609	6374	1785	2142	2346	2652	2856
22.0	114.8	21.000	0.500	22.0	22.0	33.772	17.488	4.766	700	962	962	1399	1399	1574	1661	1924	2186	612	734	804	909	979
22.0	142.7	20.750	0.625	22.0	22.0	41.970	22.124	4.747	885	1217	1217	1770	1770	1991	2102	2434	2766	774	929	1018	1150	1239
22.0	170.2	20.500	0.750	22.0	22.0	50.069	27.636	6.016	1105	1520	1520	2211	2211	2487	2625	3040	3455	967	1161	1271	1437	1548
22.0	224.3	20.000	1.000	22.0	22.0	65.973	42.426	10.077	1697	2333	2333	3394	3394	3818	4030	4667	5303	1485	1782	1952	2206	2376
22.0	277.0	19.500	1.250	22.0	22.0	81.485	56.319	10.800	2253	3098	3098	4506	4506	5069	5350	6195	7040	1971	2365	2591	2929	3154
24.0	125.5	23.000	0.500	24.0	24.0	36.914	19.096	4.766	764	1050	1050	1528	1528	1719	1814	2101	2387	668	802	878	993	1069
24.0	156.0	22.750	0.625	24.0	24.0	45.897	24.165	4.747	967	1329	1329	1933	1933	2175	2296	2658	3021	846	1015	1112	1257	1353
24.0	186.2	22.500	0.750	24.0	24.0	54.782	30.196	6.016	1208	1661	1661	2416	2416	2718	2869	3322	3775	1057	1268	1389	1570	1691
24.0	245.6	22.000	1.000	24.0	24.0	72.257	46.397	10.077	1856	2552	2552	3712	3712	4176	4408	5104	5800	1624	1949	2134	2413	2598
24.0	303.7	21.500	1.250	24.0	24.0	89.339	61.644	10.800	2466	3390	3390	4932	4932	5548	5856	6781	7706	2158	2589	2836	3205	3452
24.0	360.5	21.000	1.500	24.0	24.0	106.029	70.174	11.016	2807	3860	3860	5614	5614	6316	6667	7719	8772	2456	2947	3228	3649	3930
26.0	136.2	25.000	0.500	26.0	26.0	40.055	20.705	4.766	828	1139	1139	1656	1656	1863	1967	2278	2588	725	870	952	1077	1159
26.0	169.4	24.750	0.625	26.0	26.0	49.824	26.207	4.747	1048	1441	1441	2097	2097	2359	2490	2883	3276	917	1101	1206	1363	1468
26.0	202.3	24.500	0.750	26.0	26.0	59.494	32.756	6.016	1310	1802	1802	2620	2620	2948	3112	3603	4095	1146	1376	1507	1703	1834
26.0	267.0	24.000	1.000	26.0	26.0	78.540	50.368	10.077	2015	2770	2770	4029	4029	4533	4785	5540	6296	1763	2115	2317	2619	2821
26.0	330.4	23.500	1.250	26.0	26.0	97.193	66.969	10.800	2679	3683	3683	5358	5358	6027	6362	7367	8371	2344	2813	3081	3482	3750
26.0	392.5	23.000	1.500	26.0	26.0	115.454	76.268	11.016	3051	4195	4195	6101	6101	6864	7245	8389	9534	2669	3203	3508	3966	4271
28.0	146.9	27.000	0.500	28.0	28.0	43.197	22.313	4.766	893	1227	1227	1785	1785	2008	2120	2454	2789	781	937	1026	1160	1250
28.0	182.7	26.750	0.625	28.0	28.0	53.751	28.248	4.747	1130	1554	1554	2260	2260	2542	2684	3107	3531	989	1186	1299	1469	1582
28.0	218.3	26.500	0.750	28.0	28.0	64.206	35.315	6.016	1413	1942	1942	2825	2825	3178	3355	3885	4414	1236	1483	1624	1836	1978
28.0	288.4	26.000	1.000	28.0	28.0	84.823	54.339	10.077	2174	2989	2989	4347	4347	4891	5162	5977	6792	1902	2282	2500	2826	3043
28.0	357.1	25.500	1.250	28.0	28.0	105.047	72.294	10.800	2892	3976	3976	5784	5784	6506	6868	7952	9037	2530	3036	3326	3759	4048
28.0	424.5	25.000	1.500	28.0	28.0	124.878	82.362	11.016	3294	4530	4530	6589	6589	7413	7824	9060	....	2883	3459	3789	4283	4612

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XL Systems, Inc.—XLF

Type: Integral, flush Seal: Metal-to-metal

D	w	d	t	D_s	D_{se}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125	Grade B	X-42	X-46	X-52	X-56
30.0	196.1	28.750	0.625	30.0	30.0	57.678	30.290	4.747	1212	1666	1666	2423	2423	2726	2878	3332	3786	1060	1272	1393	1575	1696
30.0	234.3	28.500	0.750	30.0	30.0	68.919	37.875	6.016	1515	2083	2083	3030	3030	3409	3598	4166	4734	1326	1591	1742	1970	2121
30.0	309.7	28.000	1.000	30.0	30.0	91.106	58.310	10.077	2332	3207	3207	4665	4665	5248	5539	6414	7289	2041	2449	2682	3032	3265
30.0	383.8	27.500	1.250	30.0	30.0	112.901	77.619	10.800	3105	4269	4269	6210	6210	6986	7374	8538	9702	2717	3260	3570	4036	4347
30.0	456.6	27.000	1.500	30.0	30.0	134.303	88.456	11.016	3538	4865	4865	7076	7076	7961	8403	9730	....	3096	3715	4069	4600	4954
30.0	528.0	26.500	1.750	30.0	30.0	155.312	110.584	14.050	4423	6082	6082	8847	8847	9953	....	....	....	3870	4645	5087	5750	6193
30.0	598.1	26.000	2.000	30.0	30.0	175.929	130.267	15.419	5211	7165	7165	.....	.....	.....	.....	.....	.....	4559	5471	5992	6774	7295

XL Systems, Inc.—XLC

Type: Integral, flush Seal: Threaded

D	w	d	t	D_s	D_{se}	A_t	A_c	L_m	Minimum joint tension strength, kips H-40	J-55	K-55	L-80	N-80	C-90	C/T-95	P-110	Q-125	Grade B	X-42	X-46	X-52	X-56
30.0	234.3	28.5	0.75	30.0	30.0	68.919	45.610	5.956	1824	2509	2509	3649	3649	4105	4333	5017	5701	1596	1916	2098	2372	2554
30.0	309.7	28.0	1.00	30.0	30.0	91.106	63.805	7.735	2552	3509	3509	5104	5104	5742	6061	7019	7976	2233	2680	2935	3318	3573
30.0	383.8	27.5	1.25	30.0	30.0	112.901	87.583	9.792	3503	4817	4817	7007	7007	7882	8320	9634	....	3065	3678	4029	4554	4905
30.0	456.6	27.0	1.50	30.0	30.0	134.303	105.796	10.178	4232	5819	5819	8464	8464	9522	....	....	....	3703	4443	4867	5501	5925
30.0	528.0	26.5	1.75	30.0	30.0	155.312	124.079	11.853	4963	6824	6824	9926	9926	....	....	....	....	4343	5211	5708	6452	6948
30.0	598.1	26.0	2.00	30.0	30.0	175.929	141.912	11.618	5676	7805	7805	....	....	....	....	....	....	4967	5960	6528	7379	7947
32.0	250.3	30.5	0.75	32.0	32.0	73.631	48.701	5.956	1948	2679	2679	3896	3896	4383	4627	5357	6088	1705	2045	2240	2532	2727
32.0	331.1	30.0	1.00	32.0	32.0	97.389	68.159	7.735	2726	3749	3749	5453	5453	6134	6475	7497	8520	2386	2863	3135	3544	3817
32.0	410.5	29.5	1.25	32.0	32.0	120.755	93.615	9.792	3745	5149	5149	7489	7489	8425	8893	....	....	3277	3932	4306	4868	5242
32.0	488.6	29.0	1.50	32.0	32.0	143.728	113.135	10.178	4525	6222	6222	9051	9051	....	....	....	....	3960	4752	5204	5883	6336
32.0	565.4	28.5	1.75	32.0	32.0	166.308	132.750	11.853	5310	7301	7301	....	....	....	....	....	....	4646	5576	6107	6903	7434
32.0	640.8	28.0	2.00	32.0	32.0	188.496	151.902	11.618	6076	8355	8355	....	....	....	....	....	....	5317	6380	6987	7899	8507
34.0	266.3	32.5	0.75	34.0	34.0	78.343	51.792	5.956	2072	2849	2849	4143	4143	4661	4920	5697	6474	1813	2175	2382	2693	2900
34.0	352.4	32.0	1.00	34.0	34.0	103.673	72.514	7.735	2901	3988	3988	5801	5801	6526	6889	7977	9064	2538	3046	3336	3771	4061
34.0	437.2	31.5	1.25	34.0	34.0	128.609	99.646	9.792	3986	5481	5481	7972	7972	8968	9466	....	....	3488	4185	4584	5182	5580
34.0	520.7	31.0	1.50	34.0	34.0	153.153	120.473	10.178	4819	6626	6626	9638	9638	....	....	....	....	4217	5060	5542	6265	6746
34.0	602.8	30.5	1.75	34.0	34.0	177.304	141.421	11.853	5657	7778	7778	....	....	....	....	....	....	4950	5940	6505	7354	7920
34.0	683.5	30.0	2.00	34.0	34.0	201.062	161.893	11.618	6476	8904	8904	....	....	....	....	....	....	5666	6800	7447	8418	9066
36.0	282.4	34.5	0.75	36.0	36.0	83.056	54.884	5.956	2195	3019	3019	4391	4391	4940	5214	6037	6861	1921	2305	2525	2854	3074
36.0	373.8	34.0	1.00	36.0	36.0	109.956	76.868	7.735	3075	4228	4228	6149	6149	6918	7302	8455	9609	2690	3228	3536	3997	4305
36.0	463.9	33.5	1.25	36.0	36.0	136.463	105.678	9.792	4227	5812	5812	8454	8454	9511	....	....	....	3699	4438	4861	5495	5918
36.0	552.7	33.0	1.50	36.0	36.0	162.577	127.812	10.178	5112	7030	7030	....	....	....	....	....	....	4473	5368	5879	6646	7157
36.0	640.1	32.5	1.75	36.0	36.0	188.299	150.092	11.853	6004	8255	8255	....	....	....	....	....	....	5253	6304	6906	7805	8405
36.0	726.2	32.0	2.00	36.0	36.0	213.628	171.883	11.618	6875	9454	9454	....	....	....	....	....	....	6016	7219	7907	8938	9625
38.0	298.4	36.5	0.75	38.0	38.0	87.768	57.975	5.956	2319	3189	3189	4638	4638	5218	5508	6377	7247	2029	2435	2667	3015	3247
38.0	395.2	36.0	1.00	38.0	38.0	116.239	81.222	7.735	3249	4467	4467	6498	6498	7310	7716	8934	....	2843	3411	3736	4224	4548
38.0	490.6	35.5	1.25	38.0	38.0	144.317	111.710	9.792	4468	6144	6144	8937	8937	....	....	....	....	3910	4692	5139	5809	6256
38.0	584.7	35.0	1.50	38.0	38.0	172.002	135.151	10.178	5406	7433	7433	....	....	....	....	....	....	4730	5676	6217	7028	7568
38.0	677.5	34.5	1.75	38.0	38.0	199.295	158.763	11.853	6351	8732	8732	....	....	....	....	....	....	5557	6668	7303	8256	8891
38.0	769.0	34.0	2.00	38.0	38.0	226.195	181.873	11.618	7275	....	....	....	....	....	....	....	....	6366	7639	8366	9457	....
40.0	314.4	38.5	0.75	40.0	40.0	92.481	61.066	5.956	2443	3359	3359	4885	4885	5496	5801	6717	7633	2137	2565	2809	3175	3420
40.0	416.5	38.0	1.00	40.0	40.0	122.522	85.576	7.735	3423	4707	4707	6846	6846	7702	8130	9413	....	2995	3594	3936	4450	4792
40.0	517.3	37.5	1.25	40.0	40.0	152.171	117.742	9.792	4710	6476	6476	9419	9419	....	....	....	....	4121	4945	5416	6123	6594
40.0	616.8	37.0	1.50	40.0	40.0	181.427	142.490	10.178	5700	7837	7837	....	....	....	....	....	....	4987	5985	6555	7409	7979
40.0	714.9	36.5	1.75	40.0	40.0	210.290	167.433	11.853	6697	9209	9209	....	....	....	....	....	....	5860	7032	7702	8707	9376
40.0	811.7	36.0	2.00	40.0	40.0	238.761	191.863	11.618	7675	....	....	....	....	....	....	....	....	6715	8058	8826	9977	....
40.0	907.1	35.5	2.25	40.0	40.0	266.839	221.510	13.586	8860	....	....	....	....	....	....	....	....	7753	9303	10189	....	....
42.0	330.4	40.5	0.75	42.0	42.0	97.193	64.158	5.956	2566	3529	3529	5133	5133	5774	6095	7057	8020	2246	2695	2951	3336	3593
42.0	437.9	40.0	1.00	42.0	42.0	128.805	89.931	7.735	3597	4946	4946	7194	7194	8094	8543	9892	....	3148	3777	4137	4676	5036
42.0	544.0	39.5	1.25	42.0	42.0	160.025	123.774	9.792	4951	6808	6808	9902	9902	....	....	....	....	4332	5199	5694	6436	6931
42.0	648.8	39.0	1.50	42.0	42.0	190.852	149.828	10.178	5993	8241	8241	....	....	....	....	....	....	5244	6293	6892	7791	8390
42.0	752.3	38.5	1.75	42.0	42.0	221.286	176.104	11.853	7044	9686	9686	....	....	....	....	....	....	6164	7396	8101	9157	9862
42.0	854.4	38.0	2.00	42.0	42.0	251.327	201.854	11.618	8074	....	....	....	....	....	....	....	....	7065	8478	9285	....	....
42.0	955.2	37.5	2.25	42.0	42.0	280.976	223.360	13.586	8934	....	....	....	....	....	....	....	....	7818	9381	10275	....	....
44.0	346.4	42.5	0.75	44.0	44.0	101.905	67.249	5.956	2690	3699	3699	5380	5380	6052	6389	7397	8406	2354	2824	3093	3497	3766
44.0	459.2	42.0	1.00	44.0	44.0	135.088	94.285	7.735	3771	5186	5186	7543	7543	8486	8957	....	....	3300	3960	4337	4903	5280
44.0	570.7	41.5	1.25	44.0	44.0	167.879	129.806	9.792	5192	7139	7139	....	....	....	....	....	....	4543	5452	5971	6750	7269
44.0	680.9	41.0	1.50	44.0	44.0	200.277	157.167	10.178	6287	8644	8644	....	....	....	....	....	....	5501	6601	7230	8173	8801
44.0	789.7	40.5	1.75	44.0	44.0	232.282	184.775	11.853	7391	....	....	....	....	....	....	....	....	6467	7761	8500	9608	....
44.0	897.1	40.0	2.00	44.0	44.0	263.894	211.844	11.618	8474	....	....	....	....	....	....	....	....	7415	8897	9745	....	....
44.0	1003.3	39.5	2.25	44.0	44.0	295.113	245.210	13.586	9808	....	....	....	....	....	....	....	....	8582	....	11280	....	....
46.0	362.5	44.5	0.75	46.0	46.0	106.618	70.340	5.956	2814	3869	3869	5627	5627	6331	6682	7737	8793	2462	2954	3236	3658	3939
46.0	480.6	44.0	1.00	46.0	46.0	141.372	98.639	7.735	3946	5425	5425	7891	7891	8878	9371	....	....	3452	4143	4537	5129	5524
46.0	597.4	43.5	1.25	46.0	46.0	175.733	135.838	9.792	5434	7471	7471	....	....	....	....	....	....	4754	5705	6249	7064	7607
46.0	712.9	43.0	1.50	46.0	46.0	209.701	164.506	10.178	6580	9048	9048	....	....	....	....	....	....	5758	6909	7567	8554	9212
46.0	827.0	42.5	1.75	46.0	46.0	243.277	193.446	11.853	7738	....	....	....	....	....	....	....	....	6771	8125	8899	....	....
46.0	939.8	42.0	2.00	46.0	46.0	276.460	221.834	11.618	8873	....	....	....	....	....	....	....	....	7764	9317	10204	....	....
46.0	1051.3	41.5	2.25	46.0	46.0	309.251	257.130	13.586	....	....	....	....	....	....	....	....	....	9000	....	11828	....	....
46.0	1161.5	41.0	2.50	46.0	46.0	341.648	291.593	16.643	....	....	....	....	....	....	....	....	....	....	....	13413	....	....
48.0	378.5	46.5	0.75	48.0	48.0	111.330	73.432	5.956	2937	4039	4039	5875	5875	6609	6976	8078	9179	2570	3084	3378	3818	4112
48.0	502.0	46.0	1.00	48.0	48.0	147.655	102.994	7.735	4120	5665	5665	8240	8240	9269	9784	....	....	3605	4326	4738	5356	5768
48.0	624.1	45.5	1.25	48.0	48.0	183.587	141.870	9.792	5675	7803	7803	....	....	....	....	....	....	4965	5959	6526	7377	7945
48.0	744.9	45.0	1.50	48.0	48.0	219.126	171.845	10.178	6874	9451	9451	....	....	....	....	....	....	6015	7217	7905	8936	9623
48.0	864.4	44.5	1.75	48.0	48.0	254.273	202.117	11.853	8085	....	....	....	....	....	....	....	....	7074	8489	9297	....	....
48.0	982.6	44.0	2.00	48.0	48.0	289.027	231.825	11.618	9273	....	....	....	....	....	....	....	....	8114	9737	10664	....	....
48.0	1099.4	43.5	2.25	48.0	48.0	323.388	268.779	13.586	....	....	....	....	....	....	....	....	....	9407	....	12364	....	....
48.0	1214.9	43.0	2.50	48.0	48.0	357.356	304.882	16.643	....	....	....	....	....	....	....	....	....	....	....	14025	....	....

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SECTION 3
CASING PATCHES

	Page
Weatherford Homco™ Internal Liner Casing Patch	1-7
Bowen Lead Seal	8-10
Bowen Underwater	11-12
OD's On Special Drift Casings	13

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The Weatherford HOMCO™ Steel Internal Liner Casing Patch

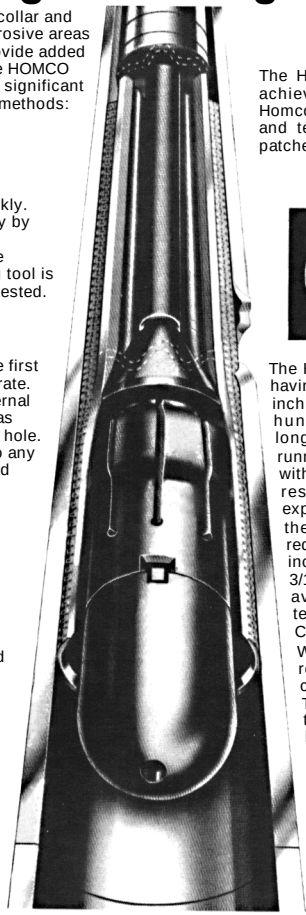
Fast, permanent repairs in downhole tubing and casing strings.

Designed to seal perforations, collar and thread leaks, splits, limited corrosive areas in tubing and casing and to provide added protection on squeeze jobs, the HOMCO Steel Liner Casing Patch offers significant advantages over other sealing methods:

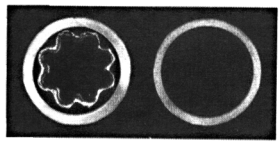
SPEED - Repairs are made quickly. Total setting time is limited only by round trip time. And there is no waiting time. Operations can be resumed as soon as the setting tool is pulled and the patch pressure tested.

CERTAINTY - You get a seal the first time if leak information is accurate. The patch will seal against external pressure differentials as great as 3500 psi over a 1 inch diameter hole. It can be successfully placed to any depth and has repeatedly sealed leaks and perforations where cementing efforts have failed.

VERSATILITY - Homco has a complete line of tools and patches for over 60 different sizes and weights of tubing and casing from 2 7/8 to 13 3/8 inches. Patches can be used in production wells, in wells that have to be deepened after patching and in disposal and storage wells. They can be run through and set below previously installed patches | and are permanent yet can be removed from the well bore by milling.



The Homco Steel Liner Casing Patch has achieved worldwide acceptance. Skilled Homco personnel, using special setting tools and techniques have installed over 5,000 patches to date.



The Homco patch is an internal steel liner having a standard wall thickness of 1/8 inch. Available in 20' lengths up to several hundred feet, they are corrugated longitudinally to provide clearance for running inside casing and tubing. Covered with a glass mat and coated with epoxy resin, the patch is expanded to conform symmetrically to the casing bore. Casing diameter is reduced .300 inch using the standard 1/8 inch liner and .480 inch using the heavier 3/16 inch wall liner. Special liners are available for high pressure and temperature operations as well as H_2S, CO_2, and corrosive conditions.

When you need fast, dependable leak repair in your downhole tubing and casing strings, HOMCO or A-1 Bit & Tool repair services are available through 72 locations worldwide. You can contact them directly or through the Divisional Offices listed below.

For additional information and case history data call Weatherford HOMCO™.

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HOW THE WEATHERFORD HOMCO™ CASING PATCH IS SET

1. The setting tool is assembled. The patch is sized to the casing. The expander assembly and casing patch are placed on the lower polished rod. The tool is run into the well. The patch is located on the leak.

2. Tubing is raised to close the circulating valve.

3. Hydraulic pressure is applied to force out buttons on the hydraulic holddown. This anchors the cylinder firmly and isolates tubing from all tensile loads caused by the setting operation.

4. Pressure on underside of pistons pulls expander assembly into the bottom of the corrugated patch. As pressure increases, the expander assembly is forced further into the patch, expanding it against the inside of the casing. Five feet of patch can be expanded in one stroke. The circulating valve is opened by lowering tubing and telescoping the slide connection. Tubing is raised again to pull up the cylinder in relation to pistons held down by the expander assembly. Expanded section of patch is anchored to the casing wall by friction and held in compressive hoop stress. Hydraulic pressures is again applied to tubing after closing the circulating valve. Hydrualic holddown buttons expand to anchor the cylinder in a new, higher position.

   The expander assembly is again forced through the corrugated patch, expanding it against the inside wall until operation is complete.
   The epoxy resin coating is extruded into any leaks or cavities in the casing wall. It acts as a gasket and additional sealing agent.
   Setting time normally requires less than 30 minutes for a 10' patch. The tool is then removed from the hole and the patch is pressure tested as required.

   Patch lengths available in any lengths and in various steels and or metals.

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TECHNICAL INFORMATION

HOMCO STEEL CORRUGATED CASING PATCH

T1.Size	Part No.	Tubing or Casing Size				Spring Collet		Liner		Wall	Patched ID Ins.
						Min. Csg. I.D. to pass Collet		Corrugated			
O.D. Ins.	Liner	O.D. Ins.	Wt. Lbs.	I.D. Ins.	Patched I.D. Ins.	w/C. Max Ins.	Clpsed. Ins.	OD Max Ins.	ID Min Ins.	Thk. Ins.	Hydril Csg. and PH6 Tbg. Joints
2-1/8	602-242	2-7/8	6.4	2.441	2.257	2.422	2.266	2.125	1.250	.065	
2-1/8	604-109	2-7/8	6.5	2.441	2.257	2.366	2.234	2.031	1.250	.065	2.191
2-1/8	604-117	3-1/2	9.3	2.992	2.752	2.891	2.703	2.638	1.250	.089	2.680
2-1/8	604-084	3-1/2	10.3	2.922	2.682	2.844	2.065	2.600	1.250	.089	2.638
2-1/8	604-113	3-1/2	12.95	2.750	2.510	2.656	2.469	2.407	1.250	.089	2.447
2-1/8	604-114	3-1/2	15.8	2.548	2.348	2.475	2.344	2.269	1.250	.065	2.301
2-1/8	604-115	3-1/2	16.7	2.480	2.280	2.400	2.250	2.190	1.250	.065	2.222
2-1/8	604-109	3-1/2	17.05	2.440	2.257	2.366	2.234	2.031	1.250	.065	2.191
3-1/2	602-071	4-1/2	9.5	4.090	3.790	3.980	3.810	3.500	2.375	.120	
3-1/2	602-071	4-1/2	10.5	4.050	3.750	3.938	3.766	3.500	2.375	.120	
3-1/2	606-574	4-1/2	11.6	4.000	3.700	3.828	3.656	3.437	2.375	.120	
3-1/2	606-575	4-1/2	13.5	3.920	3.620	3.750	3.625	3.437	2.375	.120	
3-1/2	604-497	5	13.0	4.494	4.194	4.422	4.250	3.938	2.750	.120	
3-1/2	603-004	5	15.0	4.408	4.108	4.250	4.078	3.875	2.500	.120	
3-1/2	603-024	5	18.0	4.276	3.976	4.125	3.953	3.750	2.500	.120	
4-1/2	602-238	5-1/2	14.0	5.012	4.712	4.875	4.656	4.375	3.000	.120	
4-1/2	602-238	5-1/2	15.5	4.950	4.650	4.812	4.609	4.375	3.000	.120	
4-1/2	602-239	5-1/2	17.0	4.892	4.592	4.766	4.562	4.250	2.750	.120	
4-1/2	602-239	5-1/2	20.0	4.778	4.478	4.641	4.437	4.250	2.750	.120	
3-1/2	604-082	5-1/2	23.0	4.670	4.370	4.547	4.344	4.125	2.750	.120	
4-1/2	606-761	5-3/4	17.0	5.196	4.896	5.062	4.850	4.375	3.000	.120	
4-1/2	602-238	5-3/4	22.5	4.990	4.690			4.375	3.000	.120	

8 Corrugations/Liner

(Cont. on pg 3-4)

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TECHNICAL INFORMATION

HOMCO STEEL CORRUGATED CASING PATCH

(Cont. from pg 3-3)

	T1.Size	Part No.	Tubing or Casing Size				Spring Collet		Liner		Wall	Patched ID Ins.
							Min. Csg. I.D. to pass Collet		Corrugated			
	O.D. Ins.	Liner	O.D. Ins.	Wt. Lbs.	I.D. Ins.	Patched I.D. Ins.	w/C. Max Ins.	Clpsed. Ins.	OD Max Ins.	ID Min Ins.	Thk. Ins.	Hydril Csg. and PH6 Tbg. Joints
10 Corrugations/Liner	5-1/2	606-550	6-5/8	20.0	6.049	5.749	5.891	5.718	5.375	4.187	.120	
	5-1/2	602-030	6-5/8	24.0	5.921	5.621	5.766	5.593	5.375	4.187	.120	
	5-1/2	602-063	6-5/8	28.0	5.791	5.491	5.672	5.500	5.125	3.500	.120	
	5-1/2	602-063	6-5/8	32.0	5.675	5.375			5.125	3.500	.120	
	4-1/2	606-476	6-5/8	34.0	5.595	5.295	5.438	5.250	5.125	4.000	.120	
	5-1/2	602-028	7	17.0	6.538	6.238	6.400	6.205	5.875	4.187	.120	
	5-1/2	602-028	7	20.0	6.456	6.156	6.312	6.094	5.875	4.187	.120	
	5-1/2	602-028	7	22.0	6.398	6.098	6.250	6.031	5.875	4.187	.120	
	5-1/2	601-873	7	23.0	6.366	6.066	6.250	6.031	5.750	4.187	.120	
	5-1/2	601-873	7	24.0	6.336	6.036	6.250	6.031	5.750	4.187	.120	
	5-1/2	601-873	7	26.0	6.276	5.976	6.172	5.938	5.750	4.187	.120	
	5-1/2	601-873	7	28.0	6.214	5.914			5.750	4.187	.120	
	5-1/2	602-029	7	29.0	6.184	5.884	6.031	5.828	5.500	4.187	.120	
	5-1/2	602-029	7	32.0	6.094	5.790	5.953	5.766	5.500	4.187	.120	
	5-1/2	602-030	7	35.0	6.004	5.704			5.375	4.187	.120	
	5-1/2	602-030	7	38.0	5.920	5.620	5.766	5.562	5.375	4.187	.120	
	5-1/2	601-883	7-5/8	26.4	6.969	6.669	6.812	6.609	6.250	4.500	.120	
	5-1/2	601-883	7-5/8	29.7	6.875	6.575	6.719	6.516	6.250	4.500	.120	
	5-1/2	602-172	7-5/8	33.7	6.765	6.465	6.625	6.406	6.062	4.375	.120	
	5-1/2	602-172	7-5/8	39.0	6.625	6.325	6.469	6.266	6.062	4.375	.120	
	5-1/2	602-409	8-5/8	24.0	8.097	7.797	7.906	7.734	7.312	5.312	.120	
	5-1/2	602-409	8-5/8	28.0	8.017	7.717	7.844	7.641	7.312	5.312	.120	

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TECHNICAL INFORMATION

HOMCO STEEL CORRUGATED CASING PATCH

(Cont. from pg 3-4)

10 Corrugations/Liner

T1.Size	Part No.	Tubing or Casing Size				Spring Collet		Liner		Wall	Patched ID Ins.
						Min. Csg. I.D. to pass Collet		Corrugated			
O.D. Ins.	Liner	O.D. Ins.	Wt. Lbs.	I.D. Ins.	Patched I.D. Ins.	w/C. Max Ins.	Clpsed. Ins.	OD Max Ins.	ID Min Ins.	Thk. Ins.	Hydril Csg. and PH6 Tbg. Joints
5-1/2	601-835	8-5/8	32.0	7.971	7.621	7.750	7.562	7.125	5.125	.120	
5-1/2	601-835	8-5/8	36.0	7.825	7.525	7.688	7.500	7.125	5.125	.120	
5-1/2	601-836	9-5/8	32.3	9.001	8.701	8.828	8.625	8.125	6.125	.120	
5-1/2	601-836	9-5/8	36.0	8.921	8.621	8.750	8.547	8.125	6.125	.120	
5-1/2	601-836	9-5/8	40.0	8.835	8.535	8.656	8.469	8.125	6.125	.120	
5-1/2	603127	9-5/8	43.5	8.755	8.455	8.578	8.391	7.875	5.875	.120	
5-1/2	603-127	9-5/8	47.0	8.681	8.381	8.500	8.312	7.875	5.875	.120	
5-1/2	603-127	9-5/8	53.5	8.535	8.235	8.375	8.172	7.875	5.875	.120	
5-1/2	601-840	10-3/4	32.75	10.192	9.892			9.250	6.750	.120	
5-1/2	601-840	10-3/4	40.5	10.050	9.750	9.875	9.703	9.250	6.750	.120	
5-1/2	601-841	10-3/4	45.5	9.950	9.650	9.781	9.609	9.000	6.500	.120	
5-1/2	601-841	10-3/4	51.0	9.850	9.550	9.672	9.500	9.000	6.500	.120	
5-1/2	606-535	10-3/4	55.5	9.760	9.460	9.620	9.450	8.750	6.500	.120	
5-1/2	606-535	10-3/4	60.7	9.660	9.360	9.500	9.344	8.750	6.500	.120	
5-1/2	606-372	10-3/4	71.1	9.450	9.150	9.281	9.125	8.875	6.375	.120	
5-1/2	604-675	12-3/4	65.42	11.750	11.450	11.578	11.375	10.750	8.000	.120	
5-1/2	605-226	13-3/8	54.50	12.615	12.315	12.438	12.266	11.500	8.750	.120	
5-1/2	606-226	13-3/8	61.0	12.515	12.215	12.375	12.188	11.500	8.750	.120	
5-1/2	605-226	13-3/8	68.0	12.415	12.115	12.250	12.062	11.500	8.750	.120	
5-1/2	606-194	13-3/8	72.0	12.347	12.047	12.172	12.000	11.250	8.500	.120	
5-1/2	606-194	13-3/8	85.0	12.139	11.839	11.969	11.781	11.250	8.500	.120	

Larger sizes of casing patches up to 26" are available. Check with your Weatherford representative for information

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HOMCO CASING PATCH
PRESSURE CAPACITY

CASING O.D. (INCHES)	LINER WALL (INCHES)	LEAK SIZE (INCHES)	INTERNAL PSI	EXTERNAL PSI
2-7/8 & 3-1/2	1/16	1/2 or less	10,072	1,950
		1	5,336	1,550
		2	2,668	1,150
		3	1,779	750
3-1/2	3/32	1/2 or less	11,478	2,150
		1	5,738	1,750
		2	2,869	1,250
		3	1,913	750
4-1/2	1/8	1 or less	9,850	2,500
		2	4,925	1,700
		3	3,283	800
5-1/2	1/8	1 or less	9,850	1,850
		2	4,925	1,300
		3	3,283	750
6-5/8	1/8	1 or less	9.850	1,200
		2	4,925	950
		3	3,283	700
7	1/8	1 or less	9,850	1,100
		2	4,925	875
		3	3,283	650
7-5/8	1/8	1 or less	9,850	1,000
		2	4,925	800
		3	3,283	600
8-5/8	1/8	1 or less	9,850	900
		2	4,925	700
		3	3,283	550
9-5/8	1/8	1 or less	9,850	800
		2	4,925	650
		3	3,283	500
10-3/4	1/8	1 or less	9,850	750
		2	4,925	600
		3	3,283	450
13-3/8	1/8	1 or less	9,850	600
		2	4,925	500
		3	3,283	400

(Cont. on pg 3-7)

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(Cont. from pg 3-6)

WEATHERFORD HOMCO CASING PATCH
INTERNAL PRESSURE CAPACITY

			INTERNAL PRESSURE PROTECTION (PSI)			
PATCH WALL	PIPE O.D.	BURST EQUATION	1/2" HOLE	1" HOLE	2" HOLE	3" HOLE
1/16	2-7/8 & 3-1/2	P = 5336/D	10,672	5,336	2,668	1,779
3/32	3-1/2	P = 5738/D	11,476	5,738	2,869	1,913
1/8	4-1/2 - 13-3/8	P = 9850/D	19,700	9,850	4,925	3,283
3/16	7 - 13-3/8	P = 15431/D	30,862	15,431	7,716	5,144

BURST EQUATION
P = Internal Pressure Rating (PSI) With 20% Safety Factor
D = Diameter of Leak

Example: Standard 1/8" thick patch inside casing which has 3/4" perforations
P = 9850/D = 9850/.75 = 13,133 PSI

Charts on pages 3-6 and 3-7 are based on a combination of experimental testing, field tests and engineering calculations. The complexity of thin-walled cylinder pressure rating calculations and the effects of unknown down hole parameters (such as leak size and shape, casing ovality, strength and support of the casing, etc.) do not alow exact determination of pressure ratings for the casing patch. The figures given in the chart are to be used as a guideline and are somewhat conservative for ideal circumstances. Therefore, the information herein does not constitute any guarantee on the part of Weatherford International.

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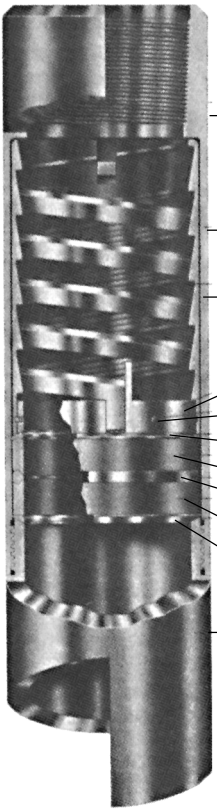
BOWEN LEAD SEAL CASING PATCHES

(Patented)



Lead Seal Casing Patch In Engaging Position

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CALCULATED STRENGTH DATA

LEAD SEAL CASING PATCHES STD. TYPE

Assembly Number	Casing Size	Patch O.D.	Setting Load Lbs.	Working Load (40% Setting Load) Lbs.	Well Pressure To Burst W/Setting Load Applied	Well Pressure To Burst W/Working Load Applied	Pull To Burst Patch (No Well Pressure)
17258	2 3/8	3 7/16	10,800	4,300	9,550	10,200	107,300
16140	2 7/8	4	13,000	5,200	8,400	9,000	124,250
26525	3 1/2	4 3/4	20,000	8,000	6,550	7,150	151,400
22400	4	5 1/4	22,550	9,000	5,400	6,000	154,600
13270	4 1/2	5 3/4	25,100	10,050	3,750	4,300	134,800
13280	5	6 1/4	27,700	11,050	3,850	4,350	159,600
12315	5 1/2	6 13/16	30,200	12,100	3,150	3,600	154,500
22410	5 3/4	7 1/16	31,250	12,500	2,950	3,400	155,900
13290	6	7 5/16	32,500	13,000	2,750	3,150	156,600
13300	6 5/8	7 63/64	37,600	15,050	2,400	2,800	167,000
12500	7	8 3/8	39,600	15,050	2,250	2,650	173,900
13070	7 5/8	9	43,000	17,200	1,950	2,300	175,500
13310	8 5/8	10 5/64	54,400	21,750	1,550	1,950	190,400
12475	9 5/8	11 1/8	58,200	23,200	1,500	1,850	212,500
13320	10 3/4	12 5/16	64,700	28,850	1,350	1,650	234,100
20855	11 3/4	13 1/2	70,5200	28,200	1,600	1,880	298,000
18445	13 3/8	15 1/2	116,700	46,650	1,500	1,850	423,700

These strength calculations are considered accurate within plus or minus 20% and are intended only as a guide. They do not constitute a guarantee, actual or implied. In use, appropriate allowance should be made as a safety factor.

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CALCULATED STRENGTH DATA

LEAD SEAL CASING PATCHES H_2S TYPE

Assembly Number	Casing Size	Patch O.D.	Setting Load Lbs.	Working Load (40% Setting Load) Lbs.	Well Pressure To Burst W/Setting Load Applied	Well Pressure To Burst W/Working Load Applied	Pull To Burst Patch (No Well Pressure)
42757	2 3/8	3 7/16	10,800	4,300	5,000	5,650	61,300
42760	2 7/8	4	13,000	5,200	4,350	4,950	70,900
42763	3 1/2	4 3/4	20,000	8,000	3,300	3,900	86,500
42766	4	5 1/4	22,550	9,000	2,700	3,250	88,300
42769	4 1/2	5 3/4	25,100	10,050	2,200	2,750	89,800
42775	5	6 1/4	27,700	11,050	1,850	2,340	91,180
42754	5 1/2	6 13/16	30,200	12,100	1,850	2,300	103,000
42778	5 3/4	7 1/16	31,250	12,500	1,700	2,150	103,900
42781	6	7 5/16	32,500	13,000	1,600	2,000	104,450
42784	6 5/8	7	37,600	15,050	1,350	1,750	111,400
42787	7	8 3/8	39,600	15,800	1,300	1,700	115,900
42790	7 5/8	9	43,000	17,200	1,180	1,450	117,000
42793	8 5/8	10 5/64	54,400	21,750	800	1,200	126,900
42796	9 5/8	11 1/8	58,200	23,200	800	1,150	141,700
42799	10 3/4	12 5/16	64,700	25,900	700	1,050	156,070
42802	11 3/4	13 1/2	70,500	28,200	850	1,150	195,960
42808	13 3/8	15 1/2	116,700	46,650	820	1,170	282,500

These strength calculations are considered accurate within plus or minus 20% and are intended only as a guide. They do not constitute a guarantee, actual or implied. In use, appropriate allowance should be made as a safety factor.

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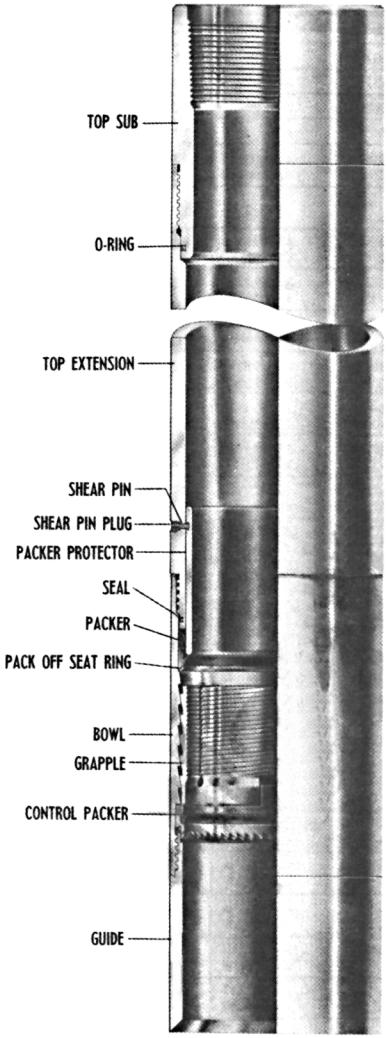
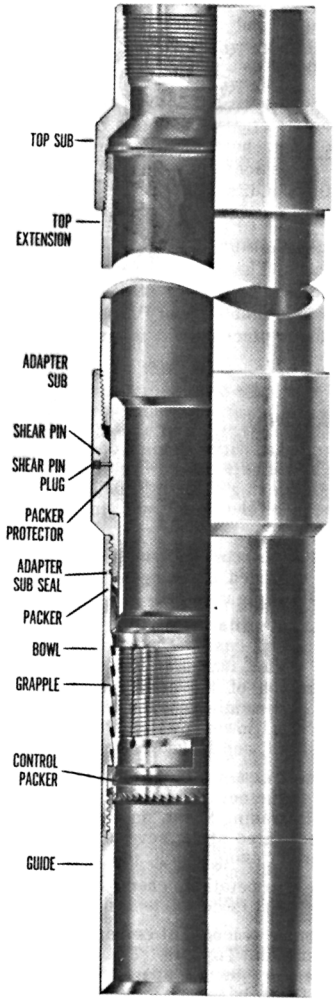
BOWEN UNDERWATER WELLHEAD CASING PATCHES



UNDERWATER
WELLHEAD CASING PATCH
WITH ALLOY TYPE EXTENSION



UNDERWATER
WELLHEAD CASING PATCH
WITH CASING TYPE EXTENSION

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BOWEN UNDERWATER WELLHEAD CASING PATCHES

Casing Size (Inches)	5-1/2	5-1/2	7	7	9-5/8	9-5/8
Casing Patch O.D. (Inches)	7-21/32	6-13/16	8-5/16	8-5/16	11-1/8	11-1/8
Extension O.D. (Inches)	7	6	8-3/8	8-3/8	11-1/8	11-3/4
Type Of Extension	Casing	Alloy	Casing	Alloy	Alloy	Casing
Length Of Extension	10'	10'	10'	10'	10'	10'
Complete Assembly:						
Part No.	47778	47772	44960	47767	47972*	45000
Weight	500	455	400	730	1290	645

Casing Size (Inches)	9-5/8	10-3/4	10-3/4	13-3/8	13-3/8	13-3/8
Casing Patch O.D. (Inches)	11-1/8	14-3/8	12-5/16	17	15-1/8	17
Extension O.D. (Inches)	11-1/8	13-3/8	12-3/8	16	15-1/8	16
Type Of Extension	Alloy	Casing	Alloy	Casing	Alloy	Casing
Length Of Extension	10'	10'	10'	10'	10'	10'
Complete Assembly:						
Part No.	47758	47736	47730	43379	40398	47966*
Weight	1145	1625	1325	1300	1980	1400

* SPECIAL 2 Packers Required for these Assemblies.

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Information relative to OD when dealing with special drifted casings. This being of particular importance when deciding on an external casing patch.
This table provides guidance for quoting OD tolerances for special drift casing e.g. SSTW. It is based on past experience and requirements not listed should be checked with works.
It is British Steel's policy to improve product specifications wherever possible and this information is therefore subject to change without prior notice.
This table contains no major changes form the July '87 issue.

OD	WT	DRIFT	API MAX OD	SPECIAL DRIFT	BSC MAX OD	OVER SIZE	BSC MAX OD	OVER SIZE
7.000	23.0	6.241	7.070	#6.250	7.070			
7.000	29.0	6.059	7.070	6.125	7.090	0.020		
7.000	32.00	5.969	7.070	#6.000	7.070		7.090	0.020
7.000	32.00	5.969	7.070	6.020	7.070			
7.00	32.0	5.969	7.070	6.031	7.090	0.020		
7.000	32.0	5.989	7.070	6.025			7.090	0.020
7.000	35.0	5.879	7.070	5.900	7.070			
7.000	38.0	5.795	7.070	5.875	7.105	0.035		
9.625	40.0	8.679	9.721	#8.750	9.721			
9.625	43.5	8.599	9.721	STD			9.721	
9.625	47.0	8.625	9.721	STD			9.721	
9.625	53.5	8.379	9.721	STD			9.721	
9.625	53.5	8.379	9.721	8.425	9.721			
9.625	53.5	8.379	9.721	#8.500	9.746	0.025	9.756	0.075
9.625	53.5	8.379	9.721	8.525	9.771	0.050		
9.625	58.4	8.279	9.721	8.375	9.746	0.025		
9.625	58.4	8.279	9.721	8.425	9.796	0.075		
13.375	72.0	12.191	13.509	#12.250			13.589	0.080
13.375	72.0	12.191	13.509	12.259				
13.375	72.0	12.191	13.509	12.323	13.589	0.080		

API alternate drift size

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SECTION 4

CASING SCRAPERS

Page

Weatherford Homco™ 1-2

Bowen Tool 3

Best Oil Tool 4-6

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WEATHERFORD HOMCO™ CASING SCRAPER

The HOMCO Casing Scraper is a durable tool used to remove mud, cement, imbedded bullets, perforation burrs, rust, mill scale, etc., from inside casing walls. A smooth inside casing diameter paves the way for successful downhole operations, such as packer setting, swabbing, squeezing tools, HOMCO casing patch, etc.

Operations which leave obstacles in the casing include cementing and perforating, It is after these jobs, and before the rotary rig is removed, that the HOMCO Casing Scraper is used to good effect.

The tool is operated on drill pipe or tubing simply by raising and lowering or by rotation.

CONSTRUCTION

The finest alloy steel is used in manufacturing the HOMCO Casing Scraper. A rigid HOMCO policy assures proper design and production to achieve the best in performance.

The Casing Scraper incorporates six precision-machined pockets to receive the blades. These slots are located so as to overlap. This assures 360° coverage by the blades within the casing.

Blade teeth are of helical design which promotes the most efficient shearing action. Also, the blades are tipped with tungsten carbide and ground to close tolerances to guarantee uniform cutting edges. Blades are spring-loaded and held in firm contact with the casing at all times.

Blades of the scraper are held in the body by retainer rings. Blades are replaced in the field simply by removing the retainer rings and screws.

OPERATION

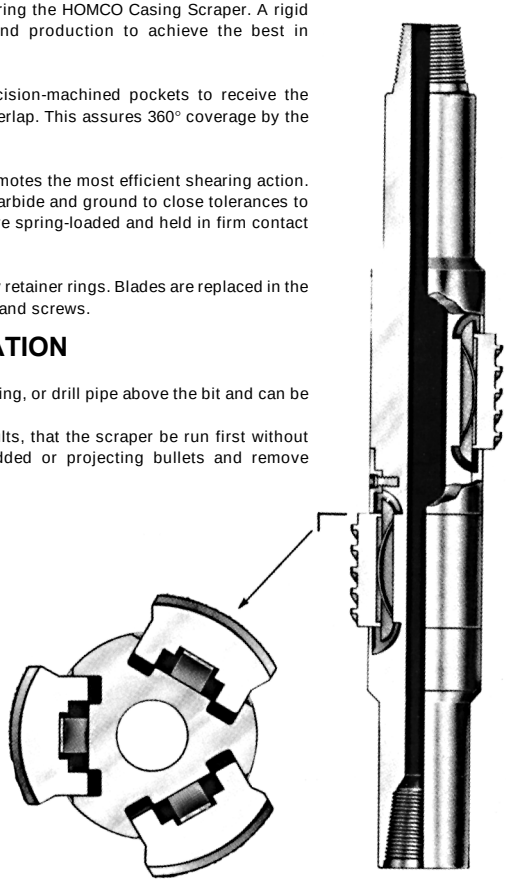
The HOMCO1 Casing Scraper is run on tubing, or drill pipe above the bit and can be rotated or spudded up and down.

It is recommended , for most efficient results, that the scraper be run first without rotation. This initial run will shear imbedded or projecting bullets and remove prominent burrs.

The scraper is then pulled back above the zone being cleaned before rotation is started. After rotation is initiated the scraper is slowly lowered. This technique, because of tooth design on the blade, assures a smooth bore, The 360° coverage makes it impossible to pass an obstruction.

It is recommended that circulaiton be maintained at all times during scraper operations, particularly while cement is being removed. Sometimes it is desirable to run a bit basket above the scraper because of light mud or low-volume pumps. Weatherford can provide Type "P" Bit Baskets.

It should be noted that the scraper may be run at the same time a bit run is made.



Blade Cross Section Casing

Scraper

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HOMCO CASING SCRAPER
SPECIFICATIONS

Complete Ass'y No.	345-105	345-108	345-110	345-115
Max. Body O.D. (Ins.)	2-3/16	3-1/8	3-1/2	3-3/4
Bore (Ins.)	7/16	3/8	1	1
Casing Range	2-7/8 Tubing	4 5.65#-13.4# (3.340-3.732" I.D.) 4-1/2 9.50#-16.60# (3.826-4.090" I.D.)	4-1/2 9.50#-16.60# (3.826-4.090" I.D.) 5 13#-24.20# (4.000-4.494" I.D.)	4-1/2 9.50# - 5 11.50# (4.090-4.560" I.D.)
Connections	1-13/16 Homco F.J. Box and Pin	2-3/8 API Reg. Box and Pin	2-3/8 API Reg. 44-1/2	2-3/8 API Reg. Box and Pin
Length (Ins.)	44-1/2	38	84	44-1/2
Weight (Lbs.)	28	63		109

Complete Ass'y No.	345-125	345-130	345-135	345-139
Max. Body O.D. (Ins.)	4-1/4	5-1/4	6-3/4	8-1/2
Bore (Ins.)	1-1/4	1-1/2	2-1/4	3
Casing Range	5 11.50# - 5-1/2 13# (4.580-5.044" I.D.)	6-5/8 24.00# - 8-5/8 24.00# (5.920-8.097" I.D.)	8-5/8 49.00# - 9-5/8 29.30# (7.511-9.063" I.D.)	10-3/4 32.75-54# (9.784-10.192" I.D.)
Connections	2-7/8 API Reg. Box and Pin	3-1/2 API Reg. Box and Pin	4-1/2 API Reg. Box and Pin	6-5/8 API Reg. Box and Pin
Length (Ins.)	46	46-7/8	52	54
Weight (Lbs.)	156	230	358	706

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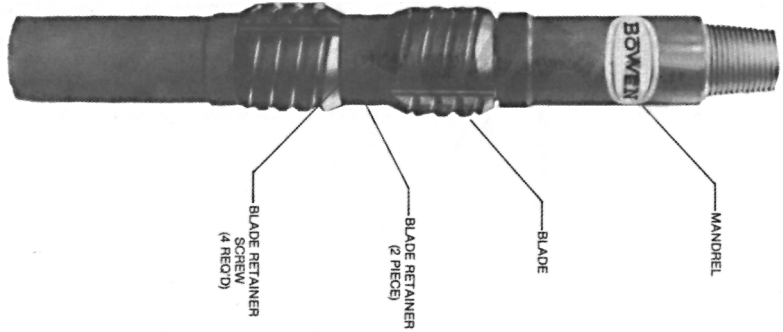
BOWEN FULL CIRCLE CASING SCRAPERS

Designed to Scrape (Inches)	4 O.D. CSG	4-1/2-5 O.D. CSG 9.5-24.2#	5-1/2 O.D. CSG 14-23#	6-5/8 O.D. CSG	7'' O.D. CSG 17-38#	9-5/8 O.D. CSG 32.3-61.1#	10-3/4 O.D. CSG	13-3/8 O.D. CSG
Can Be Dressed With Blades To Scrape (Inches)			5-3/4 CSG		7-5/8 CSG			
Tool Joint Connection (Inches)		2-3/8 API Reg.	2-7/8 API Reg.		3-1/2 API Reg.	4-1/2 API Reg.		
O.D. Of Fishing Neck (Inches)		3-1/8	3-3/4		4-1/4	5-1/2		
I.D. Of Tool (Inches)		13/16	1-1/4		1-1/2	2-1/4		
O.D. Of Tool (Inches)		3-5/8	4-3/8		5-1/2	8-1/8		
Complete Assembly:								
Part No.	150417	150032	149088	150563	149335	150025	150418	150034
Weight								

Other sizes available upon request.



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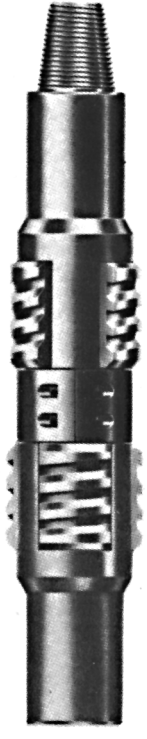
D.M. BEST COMPANY, INC.

BEST OILTOOL CASING SCRAPER



The BEST OILTOOL CASING SCRAPER * removes all mill scale, burrs, cement sheath, mud cake and any foreign matter from the inside wall of the casing forming a perfectly smooth and clean surface for the proper seating of packers. The number and the width of the scraping blades is so arranged that the tool scrapes 360° (full circumference) of the casing while being lowered into the well bore without the necessity of rotating if so desired. The scraper may also be run immediately above the bit while drilling out plugs.

The tool can be described as a two row, six to eight blade type. It is the simplest and most rugged scraper of its type available. These scrapers are manufactured from the highest quality alloy steel, properly heat treated. The blades are hard faced with tool steel and precision ground to fit the internal contour of the casing.
*Patented

SPECIFICATIONS

Special Sizes Also Available

Nom. Size	Casing Range	API Reg. Conn.	Length In.	Bore In	Tool Wt. Lbs.
BA-200	2-3/8''	1.315'' EU	24	1/2	12
BA-250	2-7/8'' thru 3/12''	1-13/16 Wilson	27	1/2	21
BB-400	4'' thru 4-1/2''	2-3/8	32 1/4	1	60
BC-500	4-1/2'' thru 5-1/2''	2-3/8	32 1/4	1	70
BC-550	5-1/2'' thru 6-5/8''	2-7/8	34	1-1/4	97
BC-700	6-5/8'' thru 8-5/8''	3-1/2	37	1-1/2	152
BA-900	8-5/8'' thru 13-3/	4-1/2	47	2-1/4	354
BA-1000	8''	6-5/8	51	3-1/2	480
	10-3/4'' thru 20''				

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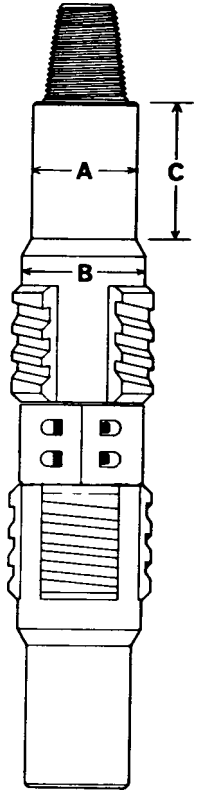
CALCULATED STRENGTHS-BEST OILTOOL
CASING SCRAPER

Nominal Size	Tension	Torsion
BA-250	196,000 Lbs.	5,104 Ft-Lbs.
BB-400	345,000 Lbs.	11,178 Ft-Lbs.
BA/BC-500	455,000 Lbs.	19,860 Ft-Lbs.
BA/BC-550	730,000 Lbs.	40,087 Ft-Lbs.
BA/BC-700	1,159,000 Lbs.	76,675 Ft-Lbs.
BA-900	1,602,000 Lbs.	143,000 Ft-Lbs.

MANDREL DIMENSIONS

Nominal Size	A	B	C
BA-200	1.8125''	1.8125''	5-1/2''
BA-250	1.8125	2.200	6
BB-400	3-1/8	3-1/8	6
BA/BC-500	3-1/4	3.625	5
BA/BC-550	3-3/4	4.410	6-1/2
BA/BC-700	4-1/4	5.375	8
BA-900	5-3/4	7.250	9
BA-1000	7-3/4	9.500	11



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BEST OILTOOL CASING SCRAPERS

Scraper	Blades	Casing		Blade Diameter	
Nom	Nom	O.D.	Wt.	Collapsed	Extended
BA - 200	BA-200 - 1	2-3/8" Tbg.	4.7	1.901	2.065
BA - 250	BA-250 - 1	2-7/8" Tbg.	6.5	2.347	2.597
	- 2	3-1/2" Tbg.	9.3	2.797	3.047
	- 3	3.02Plastic Pipe		2.750	3.000
BB - 400	BB-400 - 1	4"	11.34	3.303	3.678
	- 2	4-1/2"	9-1/2-13-1/2"	3.795	4.090
	- 2S	4-1/2"	15	3.701	3.826
	- 3	5"	15-18	4.151	4.446
	- 4	4-1/2"	18.619	3.375	3.670
BC - 500	BC-500 - 1	4-1/2"	9-1/2-13-1/2	3.795	4.280
		5"	23-24.2		
	-2	5"	11-1/2-18	4.151	4.636
	-3	5-1/2"	13-23	4.545	5.055
BC - 550	BC-550 - 1	5-1/2"	13-23	4.545	5.233
	- 2	6-5/8"	17-32	5.550	6.238
	- 3	6"	15-23	5.115	5.803
	- 4	5-3/4"	14-23	4.960	5.648
BC - 700	BC-700 - 1	7"	17-38	5.795	6.538
	- 2	7-5/8"	20-39	6.500	7.243
		7-3/4"	46.10		
	- 3	6-5/8 & 7" (41#)	17-32	5.500	6.293
	- 4	8-5/8"	24-49	7.386	8.261
		8-3/4"	49.7		
	- 5	7-5/8"	45.3	6.200	6.943
BA - 900	BA-900 - 1	8-5/8"	24-49	7.386	8.261
	- 2	9-5/8"	29.3-53.5	8.379	9.254
	- 2S	9-5/8"	58.40-71.80	7.969	8.844
		9-3/4"	59.20		
		9-7/8"	62.80		
	- 3	10-3/4"	32.75-55.5	9.604	10.479
	- 3S	10-3/4"	60.70-71.10	9.294	10.169
	- 4	13-3/8"	48-72	12.191	13.066
	- 4S	13-3/8"	77.98-98.00	11.781	12.656
		13-1/2"	81.40		
	- 5	11-3/4"	38.71	10.339	11.214
		11-7/8"	71.80		
BA - 1000	BA-1000- 1	13-3/8"	48.72	12.191	13.066
	- 2	10-3/4"	32.75-55.5	9.604	10.479
	- 3	11-3/4"	38-65	10.430	11.437
	- 4	16"	65-109	14.500	15.697
	- 5	20"	94-169	18.188	19.415

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SECTION 5

CUTTERS-SWIVELS-UNDERREAMERS & SECTION MILLS

Page

Weatherford (A-1) Casing Cutters 1-6

Weatherford S.C.O.R. Tool 7

Weatherford M.O.S.T. Tool ..... 8 - 9

Weatherford Mechanical Inside Cutters 10

Weatherford Mechanical Outside Cutters 11

Bowen Internal "Itco" Cutter ..... 12 - 14

Bowen Hydraulic External Cutter ..... 15 - 17

Bowen Mechanical External Cutter ..... 18 - 19

Weatherford McCullough External Cutter ..... 20 - 21

Weatherford McCullough Internal Cutter ..... 22 - 23

Weatherford A-1 Marine Swivel 24

A-Z Marine Swivel 25

Weatherford Window Milling System ..... 26 - 32

Weatherford A-1 Underreamers 33

Weatherford A-1 Section Mills 34

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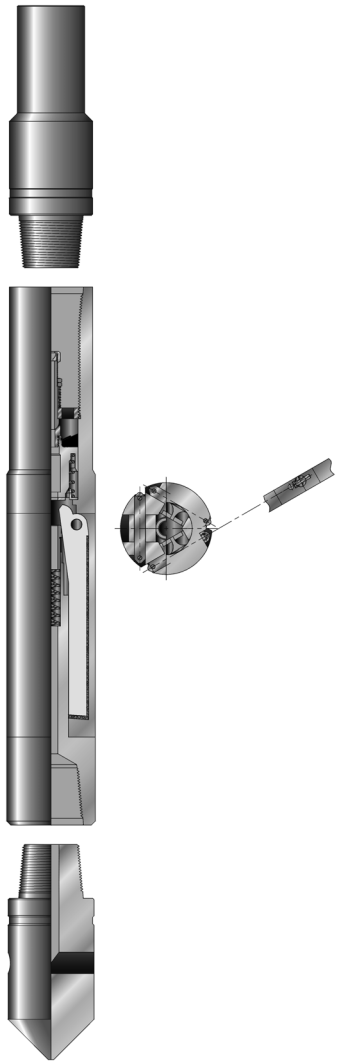
WEATHERFORD (A-1) M23 & M24 CASING CUTTER

An extremely rugged and efficient casing cutting tool, the Weatherford M23 and M24 Casing Cutter is hydraulically actuated and requires no special surface equipment. This makes it one of the most versatile and easy to operate casing cutter tools.

When the pipe is cleanly cut with the Weatherford M23 Cutter, the exclusive tattle tale indicator on the derrick floor brings about a distinct pressure drop, giving an obvious and unmistakable indication the cut is complete.

Applications:
In order to cut pipe of any size within range of the particular tool in use, only changing the knives is necessary. The rotary table or power swivel can provide rotating power. The casing cutter may be run directly on the drill pipe or with drill collars, although use of collars is not recommended except under certain conditions when additional weight is needed, such as when cutting from a floating vessel.



Features:
- Hydraulically actuated and requires no special surface equipment
- The exclusive tattle tale indicator on the derrick floor brings about a distinct pressure drop, giving an obvious and unmistakable indication the cut is complete
- Simplicity and a minimum of working parts
- All the principal parts are manufactured from special quality heat-treated alloy steel
- Inner parts, where applicable, are made from stainless steel with high corrosion resistance qualities
- All knives are dressed with the finest quality tungsten carbide available

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Weatherford (A-1) Casing Cutter Specification Guide

CASING SIZE in/*mm*	BODY O.D. in/*mm*	MAXIMUM RANGE		ASSEMBLY NUMBER	
		SINGLE STRING CUTTING FROM CENTER in/*mm*	MULTIPLE STRINGS CEMENTED BUT NOT CENTRALIZED, CUTTING FROM MAX. OFF-CENTER in/*mm*	M23	M24
4-1/2 *114.3*	3.63 *92.1*	9.63 *244.5*	7.00 *177.8*	TT13350	--
5-1/2 *139.7*	4.25 *107.9*	13.38 *339.7*	10.75 *273.1*	TT10112	--
7 *177.8*	5.500 *139.7*	20.00 *508.0*	13.38 *339.7*	--	TT10093
8-5/8 *219.1*	7.25 *184.1*	36.00 *914.4*	24.00 *609.6*	--	TT64054
9-5/8 *244.5*	8.25 *209.5*	60.00 *1524.0*	36.00 *914.4*	TT9994	--
10-3/4 *273.1*	9.50 *241.3*	60.00 *1524.0*	36.00 *914.4*	TT9940	--
13-3/8 *339.7*	12.00 *304.8*	72.0 *1828.8*	36.00 *914.4*	TT11485	TT11486

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Weatherford (A-1) Casing Cutter Knife Selection

BODY O.D. in/*mm*	CASING SIZE		KNIFE LENGTH in/*mm*	MAX. SWEEP OF KNIFE SET FULL DIAMETER in/*mm*	NUMBER OF KNIFES	KNIFE PART NO. DRESSED
	SINGLE STRING in/*mm*	MULTIPLE STRINGS CEMENTED in/*mm*				
3.625 *92.1* **M23**	4-1/2 *114.3*	--	3.10 *78.7*	5.68 *144.3*	3	TT11167
	5 *127.0*	--	3.10 *78.7*	--	3	TT11167
	7 *177.8*	7 *177.8*	5.60 *142.2*	10.50 *266.7*	3	TT11163
	4-1/2 *114.3*	--	--	6.00 *152.4*	3	TT12930
	5 *127.0*	--	--	6.00 *152.4*	3	TT12930
	7 *177.8*	--	--	8.00 *203.2*	3	TT12931
4.25 *107.9* **M23**	5 *127.0*	--	2.81 *71.4*	6.25 *158.7*	3	TT10148
	7 *177.8*	--	4.06 *103.1*	8.75 *222.2*	3	TT10150
	7-5/8 *193.7*	--	4.06 *103.1*	8.75 *222.2*	3	TT10150
	8.625 *219.1*	--	4.81 *122.2*	10.63 *270.0*	3	TT10152
	9.625 *244.5*	5-1/2 *73.03*	6.94 *176.3*	14.38 *365.2*	3	TT10154
	10.75 *273.1*	--	6.94 *176.3*	14.38 *365.2*	3	TT10154
5.50 *139.7* **M24**	7 *177.8*	--		7.50 *190.5*	4	TT10125
	7-5/8 *193.7*	--		9.12 *231.6*	4	TT10126
	7-5/8 *193.7*	--		10.00 *254.0*	4	TT10128
	8-5/8 *219.1*	--		11.75 *298.5*	4	TT10130
	10-3/4 *273.1*	9-5/8 *244.5*		13.50 *342.9*	4	TT10132
	13-3/8 *339.7*	10-3/4 *273.1*		15.75 *400.1*	4	TT10134
	16 *406.4*	13-3/8 *339.7*		21.00 *533.4*	4	TT10136
	20 *508.0*	16 *406.4*		30.75 *781.1*	4	TT10138
7.25 *184.1* **M24**	8-5/8 *219.1*	--	4.81 *122.2*	10.88 *276.3*	4	TT64038-001
	9-5/8 *244.58*	--	4.81 *122.2*	10.88 *276.3*	4	TT64038-001
	13-3/8 *339.7*	11-3/4 *298.4*	6.94 *176.3*	15.13 *384.3*	4	TT64038-002
	20 *508.0*	16 *406.4*	10.44 *265.2*	22.13 *562.1*	4	TT64038-003
	36 *914.4*	24 *609.6*	18.88 *479.5*	39.00 *990.6*	4	TT64038-004
8.25 *209.5* **M23**	9.625 *244.5*	--	5.63 *143.0*	12.00 *304.8*	3	TT9866
	10.75 *273.1*	--	5.63 *143.0*	12.00 *304.8*	3	TT9866
	11.75 *298.4*	--	7.38 *187.4*	15.50 *393.7*	3	TT9882
	13.375 *339.7*	--	7.38 *187.4*	15.50 *393.7*	3	TT9882
	16.00 *406.4*	13.38 *339.8*	9.88 *250.9*	20.50 *520.7*	3	TT9883
	20.00 *508.0*	16.00 *406.4*	11.63 *295.4*	24.00 *609.6*	3	TT9884
	24.00 *609.6*	--	--	29.00 *736.6*	3	TT9886
	26.00 *660.4*	--	--	29.00 *736.6*	3	TT9886
	30.00 *762.0*	20.00 *508,00*	16.75 *425.4*	33.00 *838.2*	3	TT9885

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Weatherford (A-1) Casing Cutter Knife Selection (Cont.)

BODY O.D. in *mm*	CASING SIZE		KNIFE LENGTH in *mm*	MAX. SWEEP OF KNIFE SET FULL DIAMETER in *mm*	NUMBER OF KNIFES	KNIFE PART NO,
	SINGLE STRING in/*mm*	MULTIPLE STRINGS CEMENTED in/*mm*				
8.25 *209.5* **M23**	33.00 *838.20*	26.00 *660.4*	20.25 *514.3*	41.00 *1041.4*	3	TT9887
	36.00 *914.40*	26.00 *660.4*	20.25 *514.3*	41.00 *1041.4*	3	TT9887
	60.00 *1524.0*	36.00 *914.4*	32.13 *816.1*	65.00 *1651.0*	3	TT12279
	48.00 *1219.2*	30.00 *762.0*	25.63 *651.0*	52.00 *1320.8*	3	TT61862
9.50 *241.3* **M23**	10-3/4 *237.1*	--	5.88 *149.2*	12.75 *323.9*	3	TT9929
	13-3/8 *339.8*	--	7.00 *177.8*	15.00 *381.0*	3	TT9931
	16 *406.4*	13-3/8 *339.8*	8.75 *222.3*	18.50 *469.9*	3	TT9941
	20 *508.0*	16 *406.4*	11.25 *285.8*	23.00 *584.2*	3	TT9939
	20 *508.0*	16 *406.4*	12.75 *323.9*	26.50 *673.1*	3	TT9914
	26 *660.4*	18 *457.2*	14.75 *374.7*	30.50 *774.7*	3	TT9933
	30 *762.0*	20 *508.0*	16.75 *425.5*	34.50 *876.3*	3	TT9937
	36 *914.4*	24 *609.6*	18.75 *476.3*	38.50 *977.9*	3	TT9935
	42 *1066.8*	26 *660.4*	20.75 *527.1*	42.50 *1079.5*	3	TT9927
	48 *1219.2*	30 *762.0*	24.75 *628.7*	50.50 *1282.7*	3	TT9925
	52 *1320.8*	33 *838.2*	27.75 *704.9*	56.50 *1435.1*	3	TT9923
	60 *1524.0*	36 *914.4*	30.75 *781.1*	62.50 *1587.5*	3	TT9829
12.00 *306* **M23**	13-3/8 *339.8*	--	6.75 *171.4*	15.50 *393.7*	3	TT62303-001
	16 *406.4*	16 *406.4*	7.88 *200.1*	17.75 *450.8*	3	TT62303-002
	18 *457.2*	16 *406.4*	7.88 *200.1*	17.75 *450.8*	3	TT62303-002
	20 *508.0*	18 *457.2*	10.38 *263.6*	22.75 *577.8*	3	TT62303-004
	20 508.0	18.63 *473.2*	12.25 311.1	26.50 *673.1*	3	TT62303-005
	24 *609.6*	20 *508.0*	13.50 *342.9*	29.00 *736.6*	3	TT62303-006
	26 *660.4*	20 *508.0*	13.50 *342.9*	29.00 *736.6*	3	TT62303-006
	30 *762.0*	24 *609.6*	16.75 *425.4*	35.50 *901.7*	3	TT62303-007
	33 *838.2*	24 *609.6*	16.75 *425.4*	35.50 *901.7*	3	TT62303-007
	36 *914.4*	26 *660.4*	18.75 *476.2*	39.50 *1003.3*	3	TT62303-008
	42 *1066.8*	30 *762.0*	22.75 *577.8*	47.50 *1206.5*	3	TT62303-009
	48 *1219.2*	33 *838.2*	25.75 *654.0*	53.50 *1358.9*	3	TT62303-010
	52 *1320.8*	36 *914.4*	29.00 *736.6*	60.00 *1524.0*	3	TT62303-011
	60 *1524.0*	--	31.50 *800.1*	65.00 *1651.0*	3	TT62303-012
	72 *1828.8*	--	37.50 *925.5*	77.00 *1955.8*	3	TT62303-013
12.00 *306* **M24**	16 *406.4*	16 *406.4*	8.88 *255.5*	19.00 *482.6*	4	TT62303-003
	24 *609.6*	20 *508.0*	14.13 *358.9*	29.00 *736.6*	4	TT62303-006
	30 *762.0*	24 *609.6*	17.13 *435.1*	35.50 *901.7*	4	TT62303-007
	42 *1066.8*	30 *762.0*	29.38 *764.2*	60.00 *1542.0*	4	TT62303-011

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SELECTING THE PROPER CUTTER ARM LENGTHS

Because multiple casing strings are rarely hung concentrically, the Eccentricity Diameters Table below was made to determine arm sizes when the strings are being cut in their most eccentric position, i.e., all strings laying on one side of the hole. It is recommended in adding 1— 3 inches to the eccentric diameters shown in the table to allow for any wear on the tips of the cutting arms.

TABLE OF ECCENTRIC DIAMETERS

(Refer to drawing on page 6)

Casing Combinations			Eccentric	Casing Combinations			Eccentric
Size A	Size B	Size C	Dia.	Size A	Size B	Size C	Dia.
9-5/8	13-3/8	20	27.881	13-3/8	26	30	49.873
9-5/8	13-3/8	24	34.839	13-3/8	26	36	55.873
9-5/8	16	20	27.916	16	20	26	32.290
9-5/8	16	24	34.874	16	20	30	40.290
9-5/8	16	26	38.874	16	20	36	52.290
10-3/4	16	20	26.791	16	24	30	41.248
10-3/4	16	24	33.749	16	24	36	53.248
10-3/4	16	26	37.749	16	26	30	41.248
13-3/8	20	26	34.915	16	26	36	53.248
13-3/8	20	30	42.915	20	24	30	37.248
13-3/8	20	36	54.915	20	24	36	49.248
13-3/8	24	30	43.873	20	26	30	37.248
13-3/8	24	36	55.873	20	26	36	49.248

EXAMPLE OF ARM SIZE SELECTION

Casing A = 9-5/8'', Casing B = 13-3/8'', Casing C = 20''

Eccentric diameter is 28 inches.

Cutter arm opening diameter: 29-31 inches.

For combination of casings not listed in the above table, the eccentric diameter can be calculated by the following formula:

$$D_{ECC} = D_B^{I.D.} + D_C^{I.D.} + D_C^{coup.} - D_A^{coup.} - D_B^{coup}$$

For explanation of above symbols see drawing on page 6.

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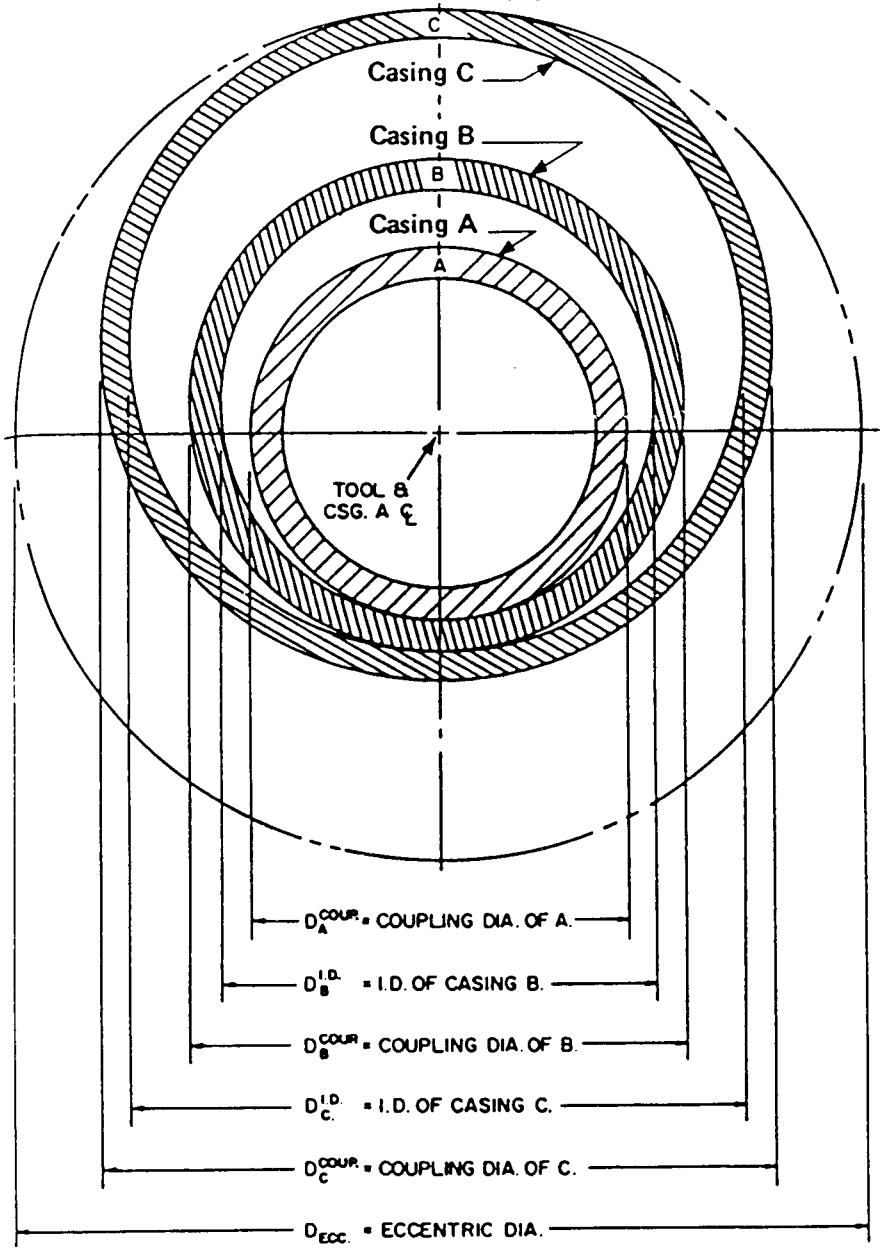
ECCENTRICITY DIAMETERS

Refer to the table on page 5



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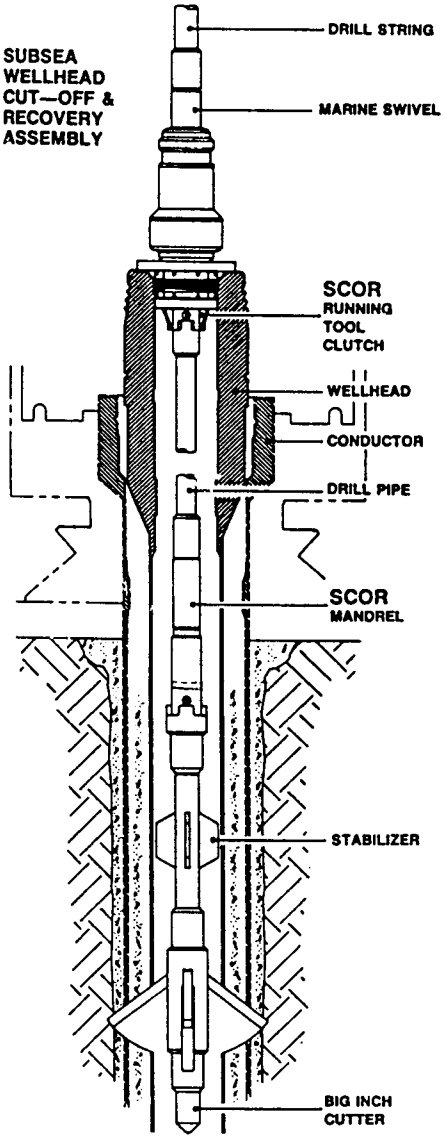
Weatherford S.C.O.R.™ Tool

Subsea Wellhead Cut-Off & Recovery Tool

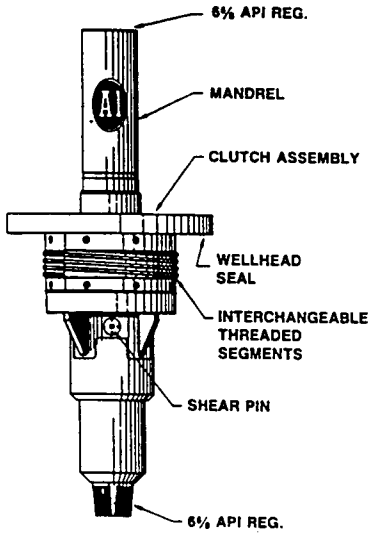


FAST
The Weahterford S.C.O.R. Tool can in one trip screw into the wellhead, cut the casing and retrieve. A versatile tool with changeable thread segments to adapt to a variety of subsea wellheads.

SIMPLE
A simple shearing of two pins separates the clutch from the mandrel. Cut the casing to a pre-determined depth and pull out. For emergency separation, engage the clutch and rotate to the right, simple and rugged.

PACKS OFF
The Clutch Assembly has a seal that seals off on the top of the wellhead. The mandrel also has seals so that when the mandrel is in the pulling (retrieval) position it seals off inside the clutch assembly. The SCOR tool now acts as a pack-off and fluid is forced out of the cut to aid retrieval of the wellhead.

COMPLETE
Weatherford can furnish the complete retrieval package including: SCOR Tool, Marine Swivel, Stabilizer, Big Inch Cutter, etc.



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Weatherford M.O.S.T. TOOL
SUBSEA WELLHEAD RETRIEVAL

The Weatherford M.O.S.T. Tool (Mechanical-Outside-Single-Trip) provides a universal wellhead well abandonment casing cutting tool. The M.O.S.T. Tool is designed to cut and recover wellheads up to 18-3/4" in

The M.O.S.T. is ideally suited for all offsore locations including deep water applications beyond the continetal shelf and capable of cutting and retrieving 9-5/8", 13-3/8", 20" and 30" casing, providing reliable, mechanical single-trip wellhead recovery.a single trip.

Features:

- External latching minimizes internal damage to wellhead
- Stops wellhead turning
- Visual latch and unlatch confirmation
- No bumper sub required to effect release or transmit torque
- Excellent lateral support
- Can remove knives from completed cut

The Weatherford M.O.S.T. Tool operates by means of mechanically activated arms that latch onto the outside wellhead profile, rather than operating internally as other systems do. Using the outside table latch technique, the M.O.S.T. minimizes damange to the recovered wellhead.

The M.O.S.T. Tool dramatically reduces cutting times. Because the tool provides excellent lateral suport while attached over the wellhead, most of the lateral whip is eliminated, allowing faster, smoother cutting.

Two versions of the M.O.S.T. System are available. A motor-driven version, which provides faster cutting in open water, with no cutting string wobble. A second version is Top Drive or Rotary Table-driven, and is run with a Marine Swivel and rubber stablizer system.

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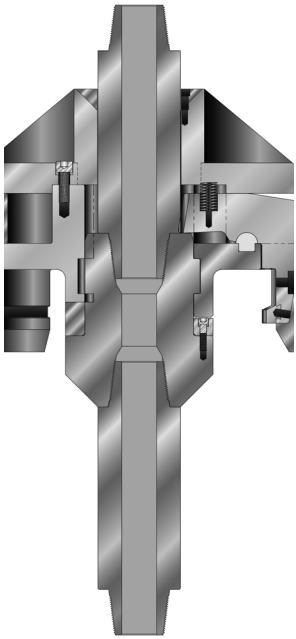
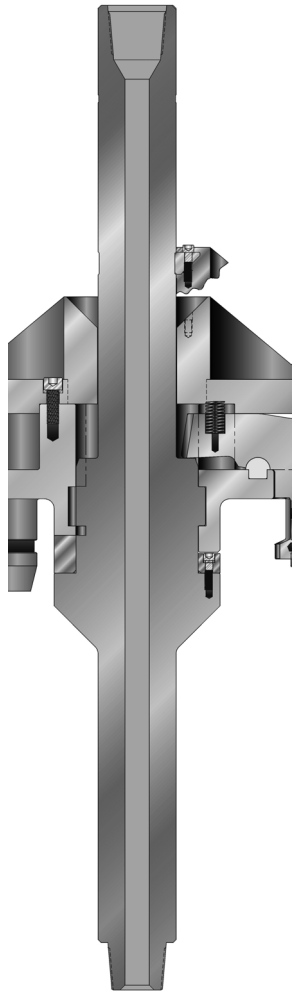


M.O.S.T. Tool for use with Mud Motor



M.O.S.T. Tool for use with Marine Swivel

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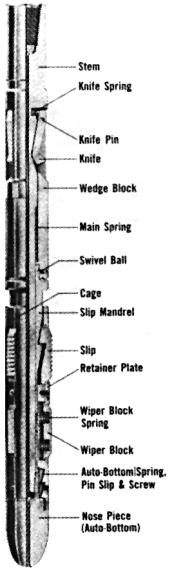
WEATHERFORD HOMCO™
REGULAR AND SPRING TYPE INSIDE CUTTER

Rugged Weatherford HOMCO inside cutters can handle a full range of cutting operations including tubing, drill pipe and casing. Except when cutting drill pipe, HOMCO cutters can be run alone or with HOMCO spears to recover the fish after the cut has been completed.

Furnished for right or left hand operations, the cutters are available in most tubing and drill pipe sizes.

The HOMCO Spring Type inside cutters are three-knife cutters.



SPECIFICATIONS

Complete Assembly No.	Designed to Cut	Tool O.D. (In.)	Length (In.)
372-412	2-3/8 O.D. Tbg.	1-13/16	27
372-440	2-7/8 O.D. Tbg. 2-7/8 IF-DP 3-1/2 Slim Hole 3-1/2 IF-DP	2	44
372-425	2-7/8 O.D. Tbg.	2-1/4	32
372-430	3-1/2 O.D. Tbg. 3-1/2 IF-DP	2-7/16	39
372-445	4 O.D. & 3-1/2 O.D. Tbg.	2-9/16	36
372-455	4-1/2 Int. Upset Drill Pipe	2-11/16	48
372-450	4-1/2 O.D. Tbg. 4-3/4 O.D. Csg.	3-1/4	43
372-465	5 IU-DP & 4-1/2 IF-DP	3-3/8	56
372-460	5 & 5-1/2 O.D. Csg.	4-1/16	44
372-476	6-5/8 thru 9. O.D. Csg.	5-9/16	55

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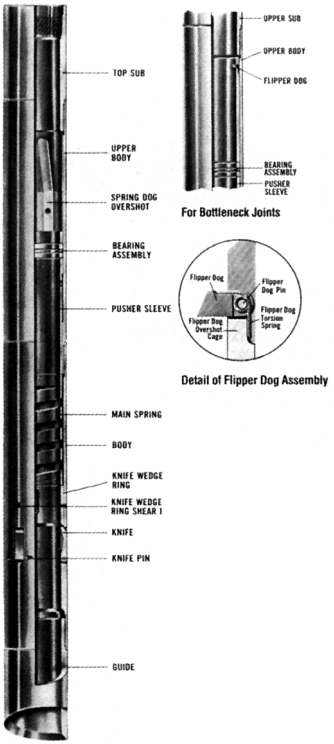
WEATHERFORD HOMCO™
TYPE A OUTSIDE CUTTER



Three-Knife Type A Outside Cutter

The automatic spring-fed control of the Weatherford HOMCO Type A outside cutter means the knives cannot be overloaded. A compression spring feeds the knives into the cut, so the strain on the tool may vary over a wide increment without affecting the cut.

The HOMCO Type A outside cutter may be equipped with one of the following type overshots:

Spring dog overshot: effective for use with couplings, collars or square shoulder tool joints.

Flipper dog overshot: used when the pipe being cut had external upset integral joints. This assembly may also be used in place of the spring dog overshot.

All Weatherford HOMCO Type A outside cutters are furnished with bearings to provide smooth operation and are available with either 3 knives or 5 knives to cut all popular sizes of drill pipe and tubing.

SPECIFICATIONS

Complete Assembly No.	O.D. (In.)	I.D. (In.)	Connection (Box)	Lengths (In.)
374-205	4-1/8	3-1/8	Optional	44
374-210	4-5/8	3-3/16	Optional	63
374-215	5-7/16	4-1/4	Optional	66
374-225	5-5/8	4-1/4	Optional	71
374-230	6-1/16	4-7/8	Optional	60
374-245	6-7/8	5-3/8	Optional	67
374-250	7-1/2	5-7/8	Optional	71
374-255	7-3/4	6-1/8	Optional	63
374-260	8	6-3/8	Optional	61
374-265	8-1/2	6-5/8	Optional	67
374-275	9-3/4	7-7/8	Optional	81

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BOWEN INTERNAL CUTTER

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BOWEN INTERNAL CUTTER - ITCO TYPE
SPECIFICATIONS

Designed To Cut	1.9 Tub.	2-3/8 Tub.	2-7/8 Tub.	2-7/8 Tub.	3-1/2 O.D. Tub	4-1/2 F.H.D.P.	4-1/2 I.F.D.P.	5 I.U.D.P.
Can Be Dressed To Cut - See Table on Pages 14 and 15		2-7/8 I.F. D.P. 2-7/8 Tub.		3-1/2 I.F. D.P.	4 Tub. 4-1/2 Tub.	4-1/2 F.H.D.P. 4-1/2 Csg.	4-1/2 Csg. 4-3/4Csg. 5 Csg.	
Minimum O.D.	1-1/2	1-13/16	2-1/4	2-1/4	2-5/8	2-1/2	3-3/8	3-3/8
I.D.	Solid	Solid	Solid	Solid	1/2	Solid	Solid	Solid
Standard Assembly With Drag Spring Or Wiper Block	D.S.	D.S.	D.S.	D.S.	W.B.	D.S.	W.B.	D.S.
Complete Assembly								
Part No . . .	25940	2174	8505	9176	8570	9465	8844	9081
Weight	15	16-1/2	22	28-1/2	39	39	54	71

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BOWEN INTERNAL CUTTER - ITCO TYPE
SPECIFICATIONS

Designed To Cut	5 O.D. Csg.	6 O.D. Csg.	7 O.D. Csg.	8-5/8 & 9 O.D. Csg.	9-5/8 O.D. Csg.	11-3/4 Csg.	13 & 13-3/8 O.D.Csg.	16 Csg.	20 Csg.
Can Be Dressed To Cut - See Table on Pages 14 and 15	5-1/2 Csg.	6-5/8 Csg. 7 Csg.	7-5/8 Csg. 8 Csg. 8-1/2 Csg.	9-5/8 Csg.	10-3/4 Csg. 11-3/4 Csg.	12 L.P.		18-5/8 Csg.	20-3/4 Csg.
Minimum O.D.	4	5	5-11/16	7-1/4	8-1/4		11-3/4	14-1/2	18-5/8
I.D.	5/8	1	1-1/2	2	2-1/4	3-1/4	3-1/4	5	5
Standard Assembly With Drag Spring Or Wiper Block	W.B.	W.B.	W.B.	W.B.	W.B.	W.B.	W.B.	W.B.	W.B.
Complete Assembly									
Part No. . .	8200	14785	8745	15532	15080	41876	19525	21240	19760
Weight. . . .	130	180	251	410	680	900	1120	1150	1200

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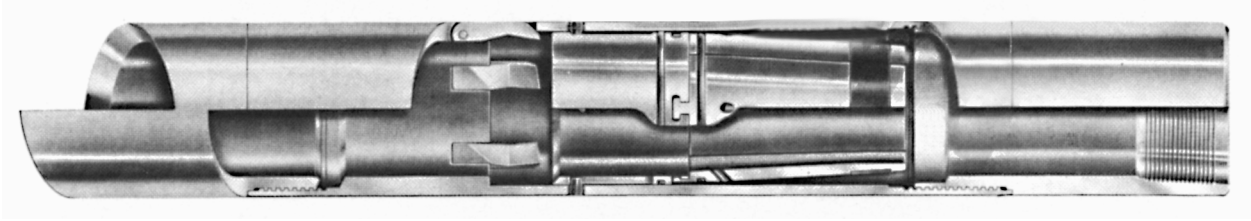
BOWEN HYDRAULIC EXTERNAL CUTTERS

SPECIFICATIONS

Size Pipe To Cut	1.315 -2-1/16	1.315 -2-3/8	1.900 -2-7/8	1.900 -2-7/8	2-1/16 -4	2-3/8 -4	3-1/2 -5
Maximum Size Cutter Will Pass Over When Dressed With Largest Size Piston	2-3/4	3-1/16	3-7/16	3-5/8	4-1/8	4-13/16	6-3/8
I.D. Of Cutter	2-7/8	3-3/16	3-5/8	3-7/8	4-5/16	4-7/8	6-1/2
O.D. Of Cutter	3-3/4	4-1/16	4-7/16	4-11/16	5-5/8	6-1/16	8
Minimum Size Hole To Run In	4	4-5/16	4-11/16	4-15/16	5-7/8	6-1/4	8-1/2
Complete Assembly							
Part No	70086	34415	70209	41727	34551	51148	35957
Weight	55	60	73	85	95	105	230



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BOWEN

HYDRAULIC EXTERNAL CUTTERS

Assembly No.	O.D.	I.D.	Piston Segment		Maximum O.D. Piston Segment Will Pass
			Assembly No.	Size	
70086	3-3/4	2-7/8	70091	2-1/2	2-1/2
			70094	1.900	2-7/16
			70097	1.600	2-3/8
			70100	1.315	2-5/16
34415	4-1/16	3-3/16	34425	2-3/8	3-1/16
			34427	2-1/16	2-7/8
			34429	1.900	2-13/16
			34432	1.660	2-11/16
			34434	1.315	2-9/16
70209	4-7/16	3-5/8	70232	2-7/8	3-3/8
			70214	2-3/8	3-3/16
			70217	2-1/16	3-1/8
			70219	1.900	3-1/16
41727	4-11/16	3-7/8	41733	2-7/8	3-3/4
			41736	2-3/8	3-9/16
			41738	2-1/16	3-3/8
			41740	1.900	3-3/8
34551	5-5/8	4-5/16	53881	4	4-3/8
			34559	3-1/2	4-1/8
			34562	2-7/8	4-1/16
			34565	2-3/8	4
			34568	2-1/16	4
51148	6-1/16	4-7/8	51151	4	4-7/8
			51230	3-1/2	4-3/4
			51345	2-7/8	4-5/8
			51344	2-3/8	4-1/2
35957	8	6-1/2	35963	5	6-1/4
			35966	4-1/2	6-1/4
			35968	4	5-7/8
			35971	3-1/2	5-7/8

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BOWEN

MAXIMUM LENGTH AND LOAD OF TUBING & D.P. TO BE PICKED UP WITH HYDRAULIC EXTERNAL CUTTER KNIVES

Tubing or D.P. Size	Cutter No.	Length (Ft.)	Load (Lbs.)	Approx. PSI	Approx. GPM
2-1/16 Tbg.	70086	1.979	7.910	30-40	200
1.900 Tbg.		1.400	4.060	25-35	220
1.600 Tbg.		1.293	3.100	20-30	125
1.315 Tbg.		1.409	2.530	20-30	120
2-3/8 Tbg.	34415	710	3.340	35-45	200
2-1/16 Tbg.		785	2.670	30-40	200
1.900 Tbg.		862	2.500	25-35	220
1.660 Tbg.		916	2.200	20-30	125
1.315 Tbg.		1.033	1.860	20-30	120
2-7/8 Tbg.	70209	410	3.570	15-25	145
2-3/8 Tbg.		360	2.140	15-25	135
2-1/16 Tbg.		536	2.140	15-25	120
1.900 Tbg.		534	1.550	10-20	125
2-7/8 D.P.	41727	142	1.480	20-30	200
2-3/8 D.P.		186	1.240	20-30	180
2-7/8 Tbg.		275	1.780	15-25	130
2-3/8 Tbg.		290	1.360	15-25	120
2-1/16 Tbg.		345	1.140	10-20	100
1.900 Tbg.		388	1.128	10-20	125
3-1/2 D.P.	34551	814	12.620	45-55	230
3-1/2 Tbg.		1.650	16.800	30-40	180
2-7/8 Tbg.		1.320	8.586	20-30	220
2-3/8 Tbg.		1.470	6.900	15-25	225
2-1/16 Tbg.		1.794	6.100	15-25	210
4 Tbg.	51148	436	4.800	30-40	200
3-1/2 Tbg.		387	3.600	20-30	160
2-7/8 Tbg.		415	2.700	15-25	125
2-3/8 Tbg.		500	2.350	15-25	135
5 D.P.	35957	460	9.040	10-20	180
4-1/2 Tbg.		350	7.030	10-15	160
4 D.P.		393	6.170	10-15	160
3-1/2 D.P.		330	5.160	10-15	140

NOTE: These are maximum static loads—if shock loaded, reduce values 50%.

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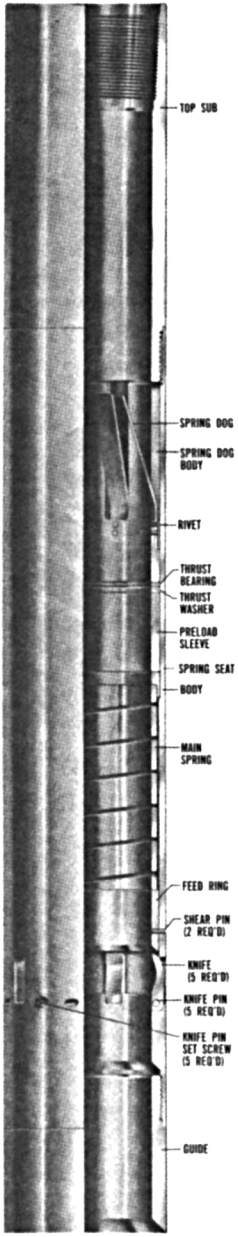
BOWEN EXTERNAL CUTTERS



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BOWEN STANDARD EXTERNAL CUTTERS

Size Pipe To Cut	1.050 1.315 Tub.	1.315 Thru 2-3/8 Tub.	1.660 Thru 2-3/8 Tub.	1.500 Thru 2-7/8 Tub.
Max. Size Will Pass Over	1.552	3-1/16	3-1/8	3-3/4
I.D. Of Cutter	1-5/8	3-1/8	3-1/4	3-7/8
O.D. Of Cutter	2-5/16	3-7/8	4-1/2	4-11/16
Min. Size Hole To Run In	2-7/16	4-1/8	4-3/4	4-15/16
Complete Assembly				
Part No.	32848	47127	47167	47210
Weight	30	51	108	78

Size Pipe To Cut	2-1/16 Thru 3-1/2	2-3/8 Thru 3-1/2	2-3/8 Thru 4"	3-1/2 D.P. 4'' D.P. 4-1/2 D.P. 5'' D.P.	4'' Thru. 5-3/4 Csg.
Max. Size Will Pass Over	4-1/4	4-1/2	4-3/4	6-1/4	6-1/2
I.D. Of Cutter	4-3/8	4-5/8	4-7/8	6-3/8	6-5/8
O.D. Of Cutter	5-5/8	5-7/8	6-1/16	7-5/8	8-1/8
Min. Size Hole To Run In	5-7/8	6-1/8	6-1/4	8-1/4	8-5/8
Complete Assembly					
Part No.	47309	47264	47360	47422	47541
Weight	181	144	154	293	281

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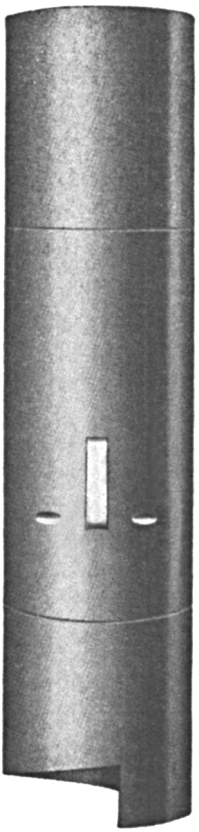
WEATHERFORD MCCULLOUGH EXTERNAL PIPE CUTTER

Actuating, cutting, releasing and pipe removal functions of the Weatherford McCullough External Pipe Cutter are under complete control of the operator at all times. It will cut at any point on the pipe; does not require a tool joint or coupling to actuate the cutting knives; and can be rotated over a fish without danger of tripping.

The McCullough External Pipe Cutter is designed to cut all types of drill pipe, tubing or casing regardless of the type tool joint or coupling in the pipe string. When equipped with a lug type feed ring it is used to cut any pipe that has tapered shoulders on the tool joints or couplings. The overshot type feed ring is used to cut pipe with tool joints or couplings that have regualr or square shoulders. A special feed ring equipped with cross bars is used to cut external flush joint pipe.

Special McCullough Thin Wall External Pipe Cutters for operation in slim holes are available on special order in any size desired.



McCullough External Pipe Cutter

OPERATION

Run the External Pipe Cutter on wash pipe, going over the top of the fish carefully, and lower cutter to the point where the cut is to be made. The operating string is then raised until the lugs or overshot springs (depending upon which feed ring is used) contact the lower shoulder of a tool joint or coupling. A further slight upward pull shears the shear pins and trips the cutter by releasing the compression spring. The cutter is then lowered to the position where the cut is to be made.

Slow right-hand rotation completes the cut. The powerful compression spring forces the feed ring down against the cutter knives, forcing them to cut through the pipe as the tool is rotated.

An important feature is that after going over the top of the fish, the cutter can be rotated if necessary to prevent pipe from sticking. Circulation can be maintained throughout the cutting operation.

When the cut is completed the knives project under the cut off portion, supporting it securely while it is being removed from the hole. Should the knives be accidentally broken, the lifting dogs or overshot springs will catch under the first tool joint or coupling and safely carry the cut off portion out of the well.

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WEATHERFORD MCCULLOUGH EXTERNAL PIPE CUTTER SPECIFICATIONS

When Ordering Give O.D. Of Pipe And Tool Joints Or Collars

Cutters Equipped To Cut Drill Pipe With A.P.I., Full Hole, Hydril "IF" or "EIU" Tool Joints. Collared Pipe And Integral Joint Drill Pipe.

Size Cutter O.D.	I.D. Of Cutter At Mouth	Max. O.D. Of Tool Joint Cutter Will Pass Over	Maximum Size Drill Pipe Casing or Tubing to Cut	Net Weight Pounds
4''	2-9/16''	2-1/2''	1-1/2'' Plain Or Upset Tubing	86
4-1/2''	3-3/16''	3-1/8''	2'' Plain or Upset Tubing 2-3/8'' D.P. with A.P.I. Std. Tool Joints.	90
4-3/4''	3-1/2''	3-3/8''	2-3/8'' D.P. with A.P.I. Full Hole Tool Joints or External Upset D.P.	93
5-3/8''	3-15/16''	3-7/8''	2-1/2'' Plain or Upset Tubing 2-7/8'' D.P. with A.P.I. Std. Tool Joints or External Upset D.P.	95
5-5/8''	4-3/8''	4-1/4''	3'' Plain Tubing 2-7/8'' D.P. with A.P.I. Full Hole Tool Joints 3-1/2'' D.P. with A.P.I. Std. Tool Joints	100
5-7/8''	4-5/8''	4-1/2''	3'' Upset Tubing 3-1/2'' External Upset D.P.	105
6-1/4''	4-3/4''	4-5/8''	3-1/2'' D.P. with A.P.I. Std. or Full Hole Tool Joints	150
6-5/8''	4-7/8''	4-3/4''	3-1/2'' D.P. with A.P.I. Full Hole Tool Joints 3-1/2'' External Upset D.P.	178
7''	5-1/8''	5''	3-1/2'' D.P. with A.P.I. Full Hole Tool Joints 3-1/2'' External Upset D.P.	183
7-3/8''	5-7/8''	5-3/4''	4-1/2'' D.P. with A.P.I. Std. or Full Hole Tool Joints 4-3/4'' or 5'' O.D. Casing	188
7-5/8''	5-7/8''	5-3/4''	4-1/2'' D.P. with A.P.I. Std. or Full Hole Tool Joints 4-3/4'' or 5'' O.D. Casing	215
8-1/8''	6-3/8''	6-1/4''	4-1/2'' External Upset D.P. 5-1/2'' O.D. Casing	228
8-1/2''	6-1/2''	6-3/8''	4-1/2'' External Upset D.P. 5-1/2'' O.D. Casing	237
9-3/8''	7-1/8''	7''	5-1/2'' D.P. with A.P.I. Std. or Full Hole Tool Joints 5-1/2'' or 5-3/4'' O.D. Casing	388
9-5/8''	7-1/2''	7-1/4''	5-1/2'' External Upset D.P.	440
9-5/8''	7-7/8''	7-3/4''	6-5/8'' D.P. with A.P.I. Std. Tool Joints 6-5/8'' or 7'' O.D. Casing	440
10-1/2''	8-3/8''	8-1/4''	6-5/8'' D.P. with A.P.I. Std. or Full Hole Tool Joints 6-5/8'' External Upset D.P.	482

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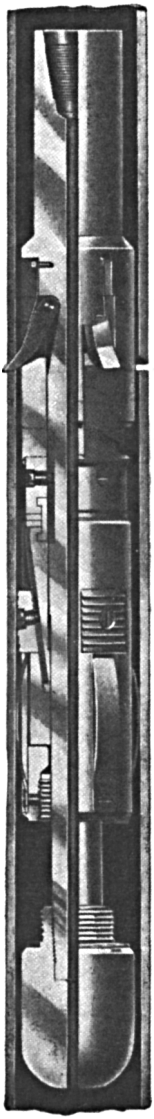
WEATHERFORD MCCULLOUGH MECHANICAL LONG KNIFE INTERNAL PIPE CUTTER



McCullough Mechanical Long Knife Pipe Cutter
Cut Completed.

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SPECIFICATIONS WEATHERFORD MCCULLOUGH

MECHANICAL LONG KNIFE
INTERNAL PIPE CUTTER

Size Cutter O.D.	Size Pipe to Cut	Size Top Thread Connection	Overall Length Cutter	Net Weight Pounds
1-7/8''	2'' Tubing	3/4'' Sucker Rod	29''	17
	2-7/8'' I.F. Drill Pipe			
2-1/4''	2-1/2'' Tubing	1-1/4'' E.U. Tubing	33''	26
	3-1/2'' I.F. Drill Pipe			
	4-1/2'' I.U. Drill Pipe			
2-11/6''	3'' Tubing	1-1/4'' E.U. Tubing	34''	40
	*4-1/2'' 16.6 lb. Drill Pipe			
3-1/16''	3-1/2'' Tubing	2'' E.U. Tubing	37''	53
	*4-1/2'' 13.7 lb. I.U. Drill Pipe			
	*5-9/16'' 25.2 lb. I.U. Drill Pipe			
3-3/4''	4'' Tubing	2-7/8'' Reg. Box	42''	90
	4-1/2'' 16.6 lb. I.F. Drill Pipe			
	4-1/2'' 11.6 lb. D.P. & 4-3/4'' O.D. Casing			
	*5-9/16'' 22.2 lb. Drill Pipe			
	4-3/4'' & 5'' O.D. Casing			
	*5-9/16'' 19.0 lb. Drill Pipe			
4-1/2''	5-1/2'' & 5-3/4'' O.D. Casing	3-1/2'' Reg. Box	45''	147
	*6-5/8'' 31.9 lb Drill Pipe			
5-1/2''	6-5/8'' & 7' O.D. Casing	3-1/2'' Reg. Box	48''	219
6-1/2''	7-5/8'' & 8-1/8'' O.D. Casing	4-1/2'' Reg. Box	54''	312
7-1/2''	8-5/8'' & 9'' O.D. Casing	4-1/2'' Reg. Box	61''	505
8-1/4''	9-5/8'' & 10-3/4'' O.D. Casing	4-1/2'' Reg. Box	68''	726
9-1/2''	10-3/4'' & 11-3/4'' O.D. Casing	5-1/2'' Reg. Box	75''	945
†12''	13-3/8'' O.D. Casing	5-1/2'' Reg. Box	84''	1200
†12''	16'' O.D. Casing	5-1/2'' Reg. Box	84''	1300

* Refers to Drill Pipe equipped with A.P.I. full hole tool joints.

† Same cutter except change of Slips, Springs and Knives.

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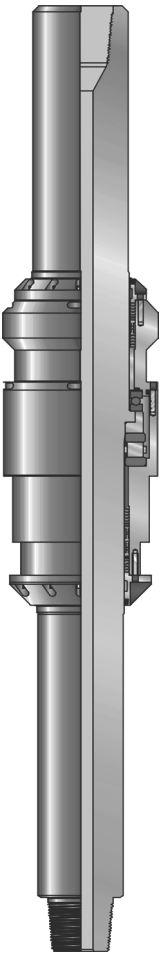
Weatherford (A-1) MARINE SWIVELS

The Marine Swivel Series from Weatherford is designed for use with Weatherford M23 and M24 Casing Cutters for cutting all sizes of casing, conductor and drive pipe from full floating and semi-submersible drilling rigs.
The Marine Swivel facilitates cutting both single and multiple-string casing, even when cemented together, and accommodates an outer string casing of up to 36” OD.



Applications:
Designed for use with Weatherford M23 and M24 Casing Cutters for cutting all sizes of casing, conductor and drive pipe from full floating and semi-submersible drilling rigs.

Features:
- Facilitates cutting both single and multiple-string casing, even when cemented together
- Accommodates an outer string casing of up to 36” OD
- Simple, rugged tool design makes the Marine Swivel reliable and easy-to-maintain
- High quality manufacturing and materials ensure safe operation, without damage to well head equipment
- Requires only minimal maintenance to ensure reliable performance

Weatherford Swivels Specifications

Series	Top Mandrel O.D. (in)	Bottom Mandrel O.D. (in)	Mandril I.D. (in)	Body O.D. (in)	Connection		Est. Weight (lbs.)
					Top	Bottom	
1050	4.75	4.75	2.00	10.50	3-1/2 IF	3-1/2 IF	960
1100	6.25	6.25	2.25	11.00	4-1/2 IF	4-1/2 IF	1070
1400	9.75	7.75	2.75	14.00	6-5/8 REG	6-5/8 REG	1420

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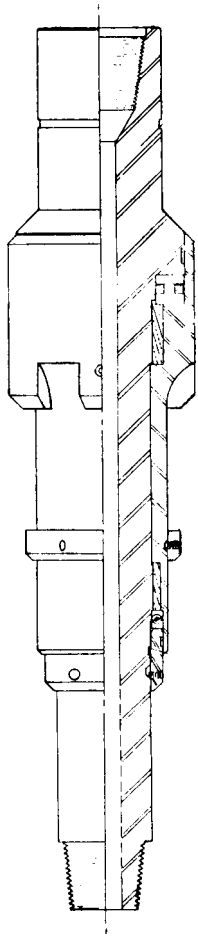
A-Z MARINE SWIVEL TYPE MSA-10

SPECIFICATIONS

Top Mandrel O.D. (in)	Bottom Mandrel O.D. (in)	Mandril I.D. (in)	Connection	
			Top	Bottom
12"	8.75"	2"	6-5/8 REG	4-1/2 IF
c/w 13-3/8", 9-5/8", 7" Adapter Sleeve 3-1/2 IF Adapter Subs				



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WEATHERFORD WINDOW MILLING SYSTEMS

Weatherford whipstocks are specialized tools used to establish new drilling courses for directional and lateral drilling in cased or open hole wells. Whipstocks provide a cost effective and efficient means of sidetracing for re-entry in existing wells to drill multiple laterals. The method can also be used to straighten a crooked hole or to avoid obstacles in the hole. Whipstock operations can be even more efficient when using a complete line of Weatherford sidetracking tools and by relying on Weatherford's team of highly qualified operators from our more than 140 locations worldwide. Weatherford whipstock products and operators have reduced sidetrack costs and saved valuable time on hundreds of wells.

Weatherford offers the following whipstock types:

Whipback™ Whipstock - A retrievable or non retrievable, mechanically set, non hinged whipstock for use in cased holes. It can be oriented and is suited for drilling multiple laterals from a single hole. The most unique feature of this whipstock is that in a deviated hole it can be set to traditionally mill up and to the right or it can be set on the low side so that it will mill downward. The top of the whipstock is concave and locks against the casing bore regardless of orientation. The system has been designed with a bypass area allowing you to sidetrack while producing.

Packwhip™ Whipstock - For cased holes is available either as a retrievable or as a non retrievable, non hinged type. Both are designed to be set into a permanent packer. If orientation is desired, the Packwhip can use a whipstock packer and stinger with an orienting system. This type of whipstock is easily oriented and ideal for running in deep holes.

Bottom Trip Whipstock - For cased holes is specially designed to be set on any solid bottom including a bridge plug, cement plug, cement retainer, liner hanger, junk or on top of a fish.

Cement Type Whipstock - Usually set in open hole. It is the simplest type, designed to accommodate setting and cementing operations. It has a standard thread connection on the bottom to allow the addition of a tail pipe. Once the whipstock is set in the open hole, a drill bit can be used to continue down the concave face of the whipstock.

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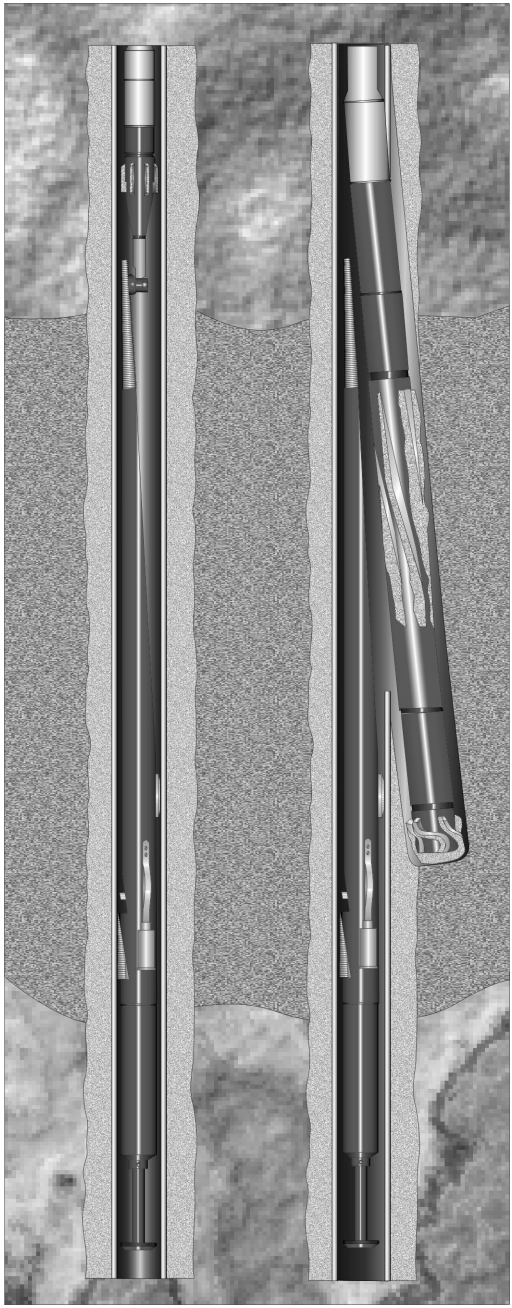

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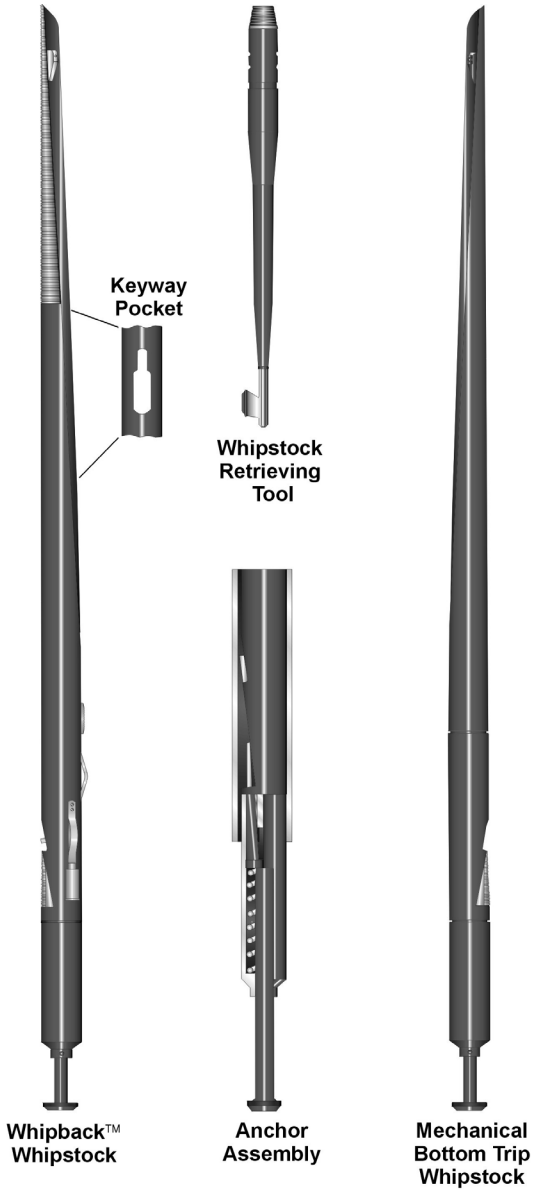

Weatherford Whipback™ Whipstock / Retrieving Tool

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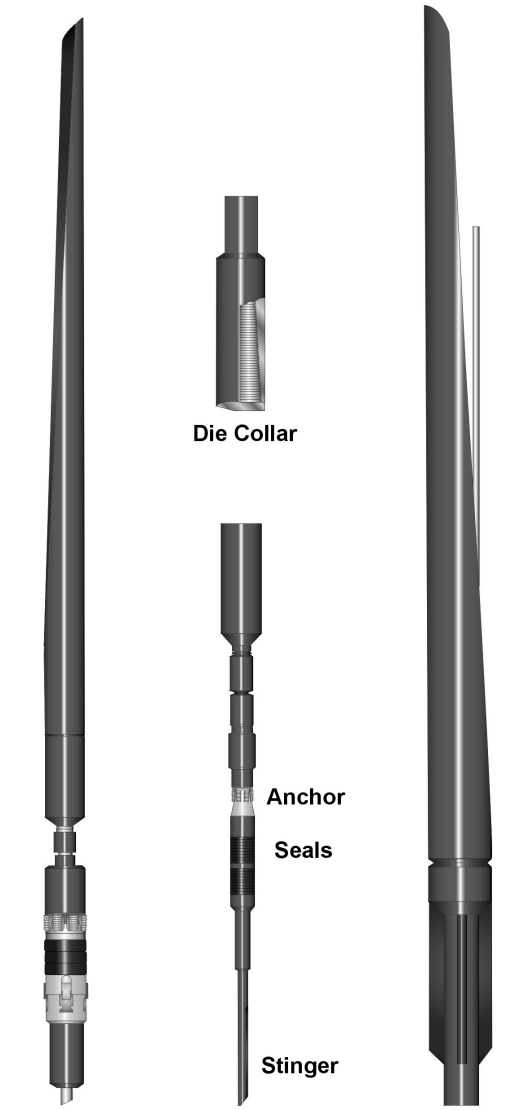

Weatherford Packwhip™ / Cement Type Whipstocks

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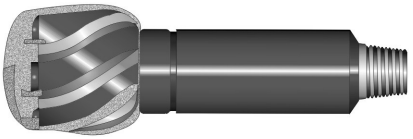
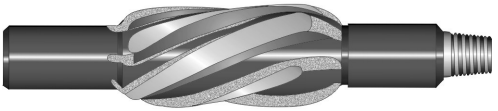
Starting Mill

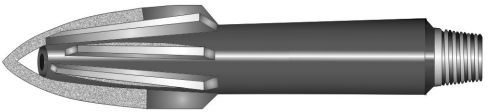


Window Mill

Watermelon Mill



String Mill



Tapered Mill

Weatherford Conventional Window Milling System Mills

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Weatherford Conventional Window Milling System

Starting Mills - This mill is used to lower the whipstock into position and to cut the initial window once the whipstock has been set and the setting stud has been sheared. The Starting Mill's taper rides down and against the pilot lug on the whipstock's concave side forcing the mill to cut through the casing and into the formation.

Window Mills - The Window Mill is used for cutting the window as a follow-up to the Starting Mill in whipstocking operations. It can be used alone or in conjunction with a Watermelon Mill on a joint of drill pipe. The mill may cut as much as ten feet into the formation.

Watermelon Mills - This mill is typically run above the Window Mill on drill pipe to assist in further opening the window. The Watermelon Mill is dressed with a slight taper on each end to elongate the top of the window. This mill is also used on the final run with a drill collar.

String Mills - The String Mill is used on the final run above the Window Mill on a drill collar. The mill is dressed cylindrically and is used to assist in elongating the window.

Tapered Mills - This mill is used when problems such as flattened, split or bent casing are encountered. The mill is not used to cut the formation.

Weatherford QuickCut™ Window Milling System

To meet today's demand for increased performance, Weatherford brings you the QuickCut™ Casing Exit System - a unique and cost-effective method, of generating windows in well casing while reducing the number of trips in the wellbore to perform the operation.

The QuickCut™ system has eliminated both starting mill and elongation runs usually required with more conventional window milling systems and ensures that a complete, full-gauge window and open hole is generated in one run in all but the most difficult formations.

The QuickCut™ is a fully retrievable system based on the industry-renowned Whipback® Retrievable Whipstock System.

Features:

- Single Trip - orient, set whipstock, and exit casing (contingent on formation conditions)
- Integral Guide Lug - protects whipstock face and directs mill into casing wall
- A choice in Anchor Type
- Full-Gauge Lead Mill - provides full opening window and rathole
- Two retrieval methods (hook-and-die collar with optional contingency concave-to-anchor separation)
- Operations Independent of Azimuth - QuickCut™ can exit on high or low side of casing
- Full Gauge Exit Results - provides smooth transition, better directional control and more weight on bit

For more information and sizes, please contact your Weatherford Sales Representive

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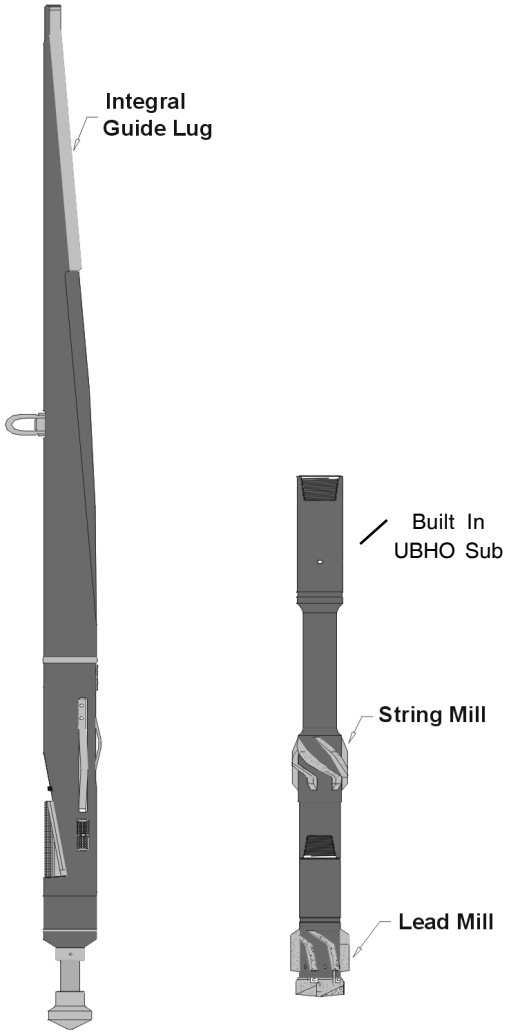

QuickCut™ Mechanical Trip Whipstock

QuickCut™ Milling BHA

Weatherford QuickCut™ Window Milling System

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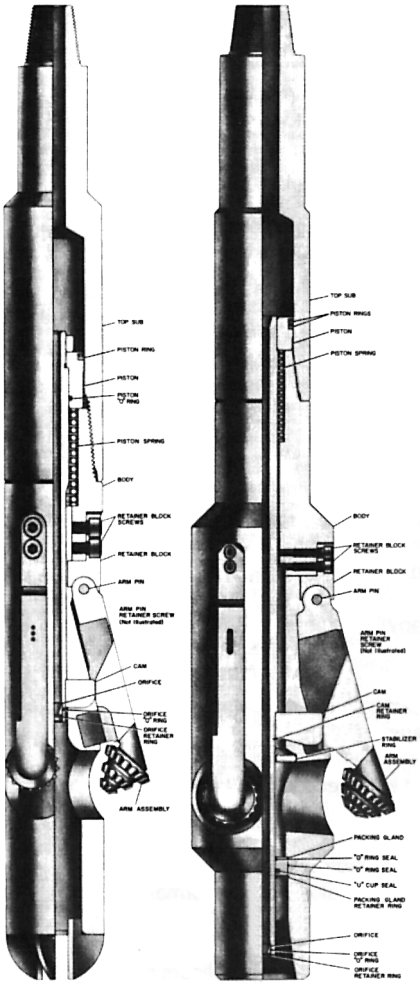
WEATHERFORD (A-1) EXPANDABLE UNDERREAMER ROCK BIT CONE TYPE



STANDARD UNDERREAMER

DRILLING TYPE UNDERREAMER

Weatherford (A-1) Expandable Underreamers are simple, yet rugged in design to allow the most efficient operation for opening up a hole. Through the use of highly effective rock bit cones on the cutting arms, the tool is exceptionally fast in opening up a hole to provide clearances for running casing, to obtain adequate annular space for cementing, or to enlarge zones for gravel pack completion.

The Weatherford (A-1) Expandable Underreamer:

- Enlarges hole up to twice the tool diameter in medium or soft formations.
- Gives positive cutter arm opening by direct pump pressure.
- Assures full volume circulation at all times.
- Features simple, rugged construction with a minimum of parts to ensure trouble-free operation.

The A-1 Expandable Underreamer is hydraulically operated. In operation, pump pressure forces an actuating piston downward. A cam attached to the lower end of the actuating piston forces the cutter arms out ot the desired diameter. A positive stop is built into the body of the tool to assure true gauge diameter.

When the pump pressure is shut off, a coil spring forces the piston and cam upward causing the cutter arms to collapse within the tool body diameter.

SPECIFICATIONS
Weatherford (A-1) EXPANDABLE UNDERREAMER

Inside Casing (Inches)	Tool O.D. (Inches)	Opening Range (Inches)
5-1/2	4-1/2 or 4-3/4	6 thru 9-1/2
6-5/8	5-3/8	7 thru 11
7	5-3/4 or 6	7 thru 13
8-5/8	7-1/4	9-1/2 thru 15
9-5/8	8-1/4	11 thru 17
10-3/4 or 11-3/4	9-1/4	12 thru 19
13-3/8	11-1/2	16 thru 22
18-5/8 or 20	15	18 thru 30
24 thru 30	22	26 thru 44

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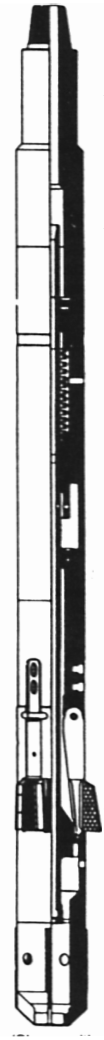


WEATHERFORD A-1 SECTION MILL

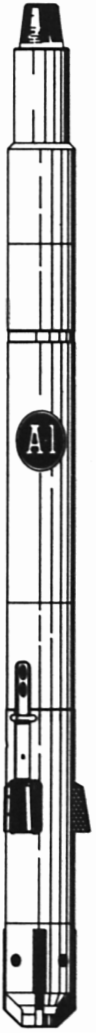
A-1 Section Mill is used primarily for milling sections in casing. Milling can usually be done as fast as cuttings can be circulated out of hole, depending on depth, pump pressure and condition of mud. At least 50 viscosity is recommended.

A-1 Section Mills to 8-in. O.D. body size have three knives. Larger sizes have four knives. Each knife has three cutting blades dressed with A-1 high quality tungsten carbide composite rod. Tungsten carbide slugs are suspended in matrix that is bonded to the mild steel blade which is the backup support for the tungsten carbide. As A-1 tungsten carbide wears away, the mild steel blade will also wear away exposing more tungsten carbide slugs. Knives can easily be replaced on rig floor by removing two cap screws from each knife retainer block.

Operating Principle Using A-1 Section Mill For Sidetracking:

1. Section is milled from casing. A permanent type A-1 WHipstock is set or cement plug is set, then drilling-off is done with down hole motor drill at angle desired.
2. The new hole may be started in any direction, since 360° opening is provided.
3. A-1 Section Mill is used to expose cased off formation. This method provides greater drainage area.
4. Formation may be underreamed after section is cut and gravel packed after original completion.
5. Old wells are easily plugged in underground storage area by milling a section of casing above and below storage formation and squeeze cementing.
6. A-1 Section Mills can be used for removing screens, liners and liner packers, cutting wash pipe that might be stuck, or cutting pipe prior to pulling.

(Shown with T.D.S. Cutters)



(Shown with T.D.S. Cutters)

SPECIFICATIONS WEATHERFORD (A-1) SECTION MILL

Casing Size (Inches)	5-1/2	6-5/8 - 7	7-5/8	8-5/8	9-5/8	10-3/4	13-3/8
Assembly Number	10364	10351	10841	10558	10277	10811	10405
Top Pin Connection	2-7/8 API Reg.	3-1/2 API Reg.	3-1/2 API Reg.	4-1/2 API Reg.	4-1/2 API Reg.	4-1/2 API Reg.	6-5/8 API Reg.
Body O.D. (Inches)	4-1/2	5-1/2	6-1/4	7-1/4	8	9	11-3.4
Weight Complete (Lbs.)	215	529	565	595	911	1070	1405

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SECTION 6

DRILL COLLARS & KELLEYS

	Page
Weights	1 - 3
Index of Mechanical Properties	4
Mechanical Properties of Drill Collars	5 - 43
Slip and Elevator Recesses	44
Kellys	45 - 48
Elevators, Spiders & Links	49 - 53

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DRILL COLLAR WEIGHTS - LBS/FT - KG/M

Collar OD	BORE OF DRILL COLLAR - in. - **mm**															
in.	1	1-1/8	1-1/4	1-1/2	1-3/4	2	2-1/4	2-1/2	2-3/4	2-13/16	3	3-1/4	3-1/2	3-3/4	4	4-1/4
mm	**25.40**	**28.57**	**31.75**	**38.10**	**44.45**	**50.80**	**57.15**	**63.50**	**69.85**	**71.44**	**76.20**	**82.55**	**88.90**	**95.25**	**101.60**	**107.95**
3	21	21	20	18	16	13										
76.20	**32**	**31**	**30**	**27**	**24**	**19**										
3-1/8	23	23	22	20	18	15	13									
79.37	**35**	**34**	**33**	**30**	**27**	**23**	**19**									
3-1/4	26	25	24	22	20	18	15									
82.55	**38**	**37**	**36**	**33**	**30**	**27**	**22**									
3-3/8	28	27	26	24	22	20	17									
85.72	**42**	**40**	**39**	**36**	**33**	**30**	**25**									
3-1/2	30	29	28	27	24	22	19	16	13							
88.90	**45**	**43**	**42**	**40**	**36**	**33**	**29**	**24**	**19**							
3-3/4	35	34	33	32	29	27	24	21	17	16	14					
95.25	**52**	**51**	**50**	**47**	**44**	**40**	**36**	**31**	**25**	**24**	**21**					
3-7/8	38	37	36	34	32	29	27	23	20	19	16					
98.42	**57**	**55**	**53**	**51**	**47**	**44**	**40**	**34**	**30**	**28**	**24**					
4	40	39	39	37	34	32	29	26	23	22	19					
101.60	**60**	**58**	**58**	**54**	**51**	**48**	**43**	**39**	**34**	**33**	**28**					
4-1/8			41	39	37	35	32	29	25	24	21	17				
104.77			**61**	**59**	**55**	**52**	**47**	**43**	**37**	**36**	**31**	**25**				
4-1/4			44	42	40	37	35	32	28	27	24	20	15			
107.95			**65**	**63**	**59**	**56**	**52**	**48**	**42**	**40**	**36**	**30**	**22**			
4-1/2			50	48	46	43	41	37	34	33	30	26	21			
114.30			**74**	**72**	**68**	**65**	**60**	**55**	**51**	**49**	**45**	**39**	**31**			
4-3/4			56	54	52	50	47	44	40	39	36	32	28	23		
120.65			**83**	**81**	**77**	**74**	**70**	**65**	**59**	**58**	**54**	**48**	**42**	**34**		
5			63	61	59	56	53	50	47	46	43	39	34	29	24	18
127.00			**94**	**90**	**87**	**83**	**79**	**74**	**70**	**68**	**64**	**58**	**51**	**43**	**36**	**27**
5-1/4				68	65	63	60	57	53	53	50	46	41	36	31	25
133.35				**101**	**97**	**94**	**89**	**85**	**79**	**79**	**74**	**68**	**61**	**54**	**46**	**37**
5-1/2				75	73	70	67	64	61	60	57	53	48	43	38	33
139.70				**111**	**108**	**104**	**100**	**95**	**90**	**89**	**84**	**79**	**71**	**64**	**57**	**49**

Continued on page 6-2

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DRILL COLLAR WEIGHTS - LBS/FT - KG/M

Collar OD	BORE OF DRILL COLLAR - in. - mm															
in.	1	1-1/8	1-1/4	1-1/2	1-3/4	2	2-1/4	2-1/2	2-3/4	2-13/16	3	3-1/4	3-1/2	3-3/4	4	4-1/4
mm	**25.40**	**28.57**	**31.75**	**38.10**	**44.45**	**50.80**	**57.15**	**63.50**	**69.85**	**71.44**	**76.20**	**82.55**	**88.90**	**95.25**	**101.60**	**107.95**
5-3/4				82	80	78	75	72	68	67	64	60	56	51	46	40
146.05				**122**	**119**	**115**	**111**	**106**	**101**	**100**	**96**	**89**	**83**	**76**	**64**	**59**
6				90	88	85	83	79	76	75	72	68	63	59	54	48
152.40				**134**	**131**	**127**	**123**	**118**	**113**	**112**	**107**	**101**	**94**	**88**	**80**	**71**
6-1/4				98	96	93	90	87	84	83	80	76	71	67	62	56
158.75				**146**	**142**	**139**	**135**	**130**	**125**	**123**	**119**	**113**	**106**	**100**	**92**	**83**
6-1/2				107	105	102	99	96	93	92	89	85	80	75	70	65
165.10				**159**	**156**	**152**	**148**	**143**	**138**	**137**	**132**	**126**	**119**	**112**	**104**	**97**
6-3/4				116	114	111	108	105	102	101	98	94	89	84	79	74
171.45				**172**	**169**	**166**	**161**	**157**	**151**	**150**	**146**	**140**	**133**	**126**	**118**	**110**
7				125	123	120	117	114	111	110	107	103	98	93	88	83
177.80				**186**	**183**	**179**	**175**	**170**	**165**	**164**	**159**	**153**	**146**	**139**	**131**	**123**
7-1/4				134	132	129	126	123	120	119	116	112	107	102	97	92
184.15				**199**	**196**	**192**	**188**	**183**	**181**	**177**	**173**	**166**	**160**	**152**	**145**	**137**
7-1/2				144	142	139	136	133	130	129	126	122	118	113	107	102
190.50				**214**	**211**	**207**	**203**	**198**	**193**	**192**	**187**	**182**	**176**	**169**	**160**	**151**
7-3/4				154	152	149	146	143	140	139	136	132	127	122	117	112
196.85				**229**	**226**	**222**	**218**	**213**	**210**	**207**	**202**	**196**	**189**	**182**	**175**	**166**
8				165	163	160	157	154	151	150	147	143	138	133	128	123
203.20				**245**	**242**	**238**	**234**	**230**	**224**	**223**	**219**	**212**	**206**	**198**	**191**	**183**
8-1/4				176	174	171	168	165	162	161	158	154	149	144	139	134
209.55				**262**	**259**	**255**	**251**	**246**	**241**	**240**	**235**	**229**	**222**	**215**	**207**	**199**
8-1/2				187	185	182	179	176	173	172	169	165	160	155	150	145
215.90				**278**	**275**	**271**	**267**	**262**	**257**	**256**	**251**	**245**	**238**	**231**	**224**	**215**
8-3/4				199	197	194	191	188	185	183	181	177	172	167	162	157
222.25				**296**	**293**	**289**	**285**	**280**	**275**	**272**	**269**	**263**	**256**	**249**	**241**	**233**
9				210	208	205	202	199	196	195	192	188	183	178	173	168
228.60				**312**	**309**	**305**	**301**	**297**	**291**	**290**	**286**	**279**	**273**	**265**	**258**	**250**
9-1/4				223	221	218	215	212	209	207	205	201	196	191	186	181
234.95				**332**	**328**	**324**	**320**	**316**	**311**	**310**	**305**	**299**	**292**	**285**	**277**	**269**

Continued on page 6-3

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DRILL COLLAR WEIGHTS - LBS/FT - KG/M

Collar OD	BORE OF DRILL COLLAR - in. - **mm**															
in.	1	1-1/8	1-1/4	1-1/2	1-3/4	2	2-1/4	2-1/2	2-3/4	2-13/16	3	3-1/4	3-1/2	3-3/4	4	4-1/4
mm	**25.40**	**28.57**	**31.75**	**38.10**	**44.45**	**50.80**	**57.15**	**63.50**	**69.85**	**71.44**	**76.20**	**82.55**	**88.90**	**95.25**	**101.60**	**107.95**
9-1/2				236	233	230	227	224	221	220	217	213	208	203	198	193
241.30				**351**	**348**	**343**	**338**	**334**	**329**	**327**	**323**	**317**	**310**	**303**	**295**	**288**
9-3/4				248	245	243	240	237	234	232	230	226	221	216	211	206
247.65				**369**	**366**	**362**	**357**	**353**	**348**	**345**	**342**	**336**	**329**	**322**	**314**	**308**
10				261	259	256	254	250	247	246	243	239	234	228	224	219
254.00				**389**	**386**	**381**	**378**	**372**	**367**	**366**	**362**	**355**	**349**	**340**	**334**	**327**
10-1/4				275	273	270	267	264	261	260	257	253	248	243	238	233
260.35				**409**	**407**	**402**	**397**	**393**	**388**	**387**	**382**	**379**	**369**	**362**	**355**	**348**
10-1/2				289	287	283	281	277	276	274	270	266	261	254	251	246
266.70				**430**	**428**	**421**	**418**	**413**	**410**	**408**	**402**	**395**	**389**	**378**	**374**	**367**
10-3/4				303	301	298	296	292	289	288	285	281	277	271	266	261
273.05				**451**	**449**	**444**	**440**	**435**	**430**	**428**	**424**	**418**	**413**	**404**	**396**	**390**
11				317	315	313	310	307	304	303	299	295	290	285	280	275
279.40				**472**	**470**	**466**	**461**	**457**	**452**	**451**	**445**	**439**	**432**	**425**	**417**	**410**
11-1/4				334	331	328	325	321	319	318	314	309	306	300	295	290
285.75				**497**	**493**	**488**	**484**	**478**	**475**	**473**	**467**	**459**	**456**	**447**	**439**	**433**
11-1/2				348	346	343	340	336	334	333	329	325	320	315	310	306
292.10				**518**	**516**	**511**	**506**	**500**	**497**	**495**	**489**	**483**	**477**	**469**	**462**	**455**
11-3/4				365	362	359	356	352	349	348	345	341	336	331	326	321
298.45				**543**	**540**	**535**	**530**	**524**	**519**	**518**	**513**	**507**	**500**	**493**	**485**	**479**
12				379	377	374	371	368	365	364	361	357	352	347	342	337
304.80				**564**	**562**	**557**	**552**	**548**	**543**	**542**	**537**	**531**	**524**	**517**	**509**	**503**

Note 1 - To determine weights of drill collars not shown use the following formula:

(Area O.D. - Area I.D.) x 3.408 = Wt./Ft. **OR** $(O.D.^2 - I.D.^2) \times 2.67 = Lb./Ft.$

Note 2 - The weight of a SPIRAL drill collar is approximately 96% the Wt. of a round collar the same O.D. or 4% reduction.

7.84 kg of steel will displace 1 litre of fluid

490 lb of steel displaces 1 cu. ft.

65.5 lb of steel displaces 1 gal

2747 lb of steel displaces 1 BBL

1000 lb of steel displaces .354 BBL

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MECHANICAL PROPERTIES OF DRILL COLLARS

	Page
NC10 - NC12 - NC13 - NC16 - NC23	5 - 6
NC26, 2 3/8 IF, 2 7/8 SH, - NC31, 2 7/8 IF, 3 1/2 SH	6 - 7
NC35 - NC38, 3 1/2 IF, 4 1/2 SH	7 - 8
NC40, 4 FH, 4 1/2 DSL, 4 Mod Open - NC44	8 - 9
NC46, 4 IF, 4 1/2 XH, 4 1/2 Semi IF, 5 DSL, 4 1/2 Mod Open	9 - 10
NC50, 5 XH, 5 Mod Open, 5 1/2 DSL, 5 Semi IF, 4 1/2 IF	10 - 11
NC56	11 - 12
NC61 - NC70 - NC77	12 - 14
API: 5 1/2 IF - 6 5/8 IF	14 - 15
API: 2 3/8 Reg thru 8 5/8 Reg	16 - 20
API: 7 5/8 Reg & 8 5/8 Reg Low Torque Face	21 - 22
2 7/8 XH, 3 1/2 DSL, 2 7/8 Mod Open - 3 1/2 XH, 4 SH, 3 1/2 Mod Open	22 - 23
API: 2 7/8 FH thru 6 5/8 FH (4 FH (NC40) on page 8)	23 - 27
2 3/8 SL H90 - 2 7/8 SL H90 - 3 1/2 SL H90	27 - 28
3 1/2 H90 thru 8 5/8 H90	28 - 35
7 H90 - 7 5/8 H90 - 8 5/8 H90 Low Torque Face	35 - 36
2 3/8 SH - 4 SH	37
2 3/8 PAC - 2 7/8 PAC - 3 1/2 PAC	37 - 38
2 3/8 OH SW, 2 3/8 OH LW	38
2 7/8 OH SW	38 - 39
3 1/2 OH SW, 3 1/2 OH LW	39
4 OH SW	39 - 40
4 OH LW	40
4 1/2 OH SW, 4 1/2 OH LW	40 - 41
2 3/8 WO thru 4 1/2 WO	41 - 43
Foot Notes	43

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
API NC10																
1.375	**34.93**	0.375	**9.53**	4.67	**6.95**	280 *	**380**	490	**670**	70,300	**31,300**	1.88	0.07	**0.89**	0.01	**0.07**
1.375	**34.93**	0.500	**12.70**	4.38	**6.52**	280 *	**380**	490	**670**	62,100	**27,600**	1.97	0.07	**0.83**	0.01	**0.13**
1.500	**38.10**	0.375	**9.53**	5.63	**8.38**	420	**580**	750	**1,020**	71,500	**31,800**	2.79	0.09	**1.07**	0.01	**0.07**
1.500	**38.10**	0.500	**12.70**	5.34	**7.95**	370	**500**	650	**880**	62,100	**27,600**	2.92	0.08	**1.01**	0.01	**0.13**
API NC12																
1.625	**41.28**	0.625	**15.88**	6.01	**8.94**	460 *	**620**	810	**1,100**	87,800	**39,000**	1.93	0.09	**1.14**	0.02	**0.20**
1.625	**41.28**	0.750	**19.05**	5.55	**8.26**	460 *	**620**	810	**1,100**	73,000	**32,400**	2.12	0.08	**1.05**	0.02	**0.29**
1.750	**44.45**	0.625	**15.88**	7.13	**10.62**	590	**810**	1,050	**1,420**	87,800	**39,000**	2.69	0.11	**1.35**	0.02	**0.20**
1.750	**44.45**	0.750	**19.05**	6.68	**9.93**	490	**660**	860	**1,170**	73,000	**32,400**	2.95	0.10	**1.27**	0.02	**0.29**
API NC13																
1.875	**47.63**	0.750	**19.05**	7.88	**11.73**	730	**990**	1,290	**1,750**	100,200	**44,500**	2.43	0.12	**1.50**	0.02	**0.29**
1.875	**47.63**	0.875	**22.23**	7.34	**10.93**	600	**810**	1,050	**1,430**	82,600	**36,700**	2.70	0.11	**1.39**	0.03	**0.39**
API NC16																
2.000	**50.80**	1.000	**25.40**	8.01	**11.92**	770 *	**1,040**	1,360	**1,840**	115,900	**51,500**	1.74	0.12	**1.52**	0.04	**0.51**
2.000	**50.80**	1.125	**28.58**	7.30	**10.86**	750	**1,030**	1,330	**1,810**	93,000	**41,300**	2.01	0.11	**1.39**	0.05	**0.64**
2.125	**53.98**	1.000	**25.40**	9.39	**13.97**	950	**1,290**	1,670	**2,270**	115,900	**51,500**	2.34	0.14	**1.78**	0.04	**0.51**
2.125	**53.98**	1.125	**28.58**	8.68	**12.91**	750	**1,030**	1,330	**1,810**	93,000	**41,300**	2.70	0.13	**1.65**	0.05	**0.64**
2.250	**57.15**	1.000	**25.40**	10.85	**16.14**	950	**1,290**	1,670	**2,270**	115,900	**51,500**	3.01	0.17	**2.06**	0.04	**0.51**
2.250	**57.15**	1.125	**28.58**	10.14	**15.09**	750	**1,030**	1,330	**1,810**	93,000	**41,300**	3.47	0.15	**1.92**	0.05	**0.64**
API NC23																
3.000	**76.20**	1.000	**25.40**	21.36	**31.79**	2,500 *	**3,400**	4,410	**5,980**	329,500	**146,500**	1.98	0.33	**4.05**	0.04	**0.51**
3.000	**76.20**	1.250	**31.75**	19.86	**29.55**	2,500 *	**3,400**	4,410	**5,980**	280,900	**124,900**	2.12	0.30	**3.77**	0.06	**0.79**
3.125	**79.38**	1.000	**25.40**	23.40	**34.83**	3,320 *	**4,510**	5,850	**7,940**	329,500	**146,500**	2.35	0.36	**4.44**	0.04	**0.51**
3.125	**79.38**	1.250	**31.75**	21.90	**32.59**	3,320 *	**4,510**	5,850	**7,940**	280,900	**124,900**	2.52	0.33	**4.16**	0.06	**0.79**
3.125	**79.38**	1.500	**38.10**	20.07	**29.86**	2,640	**3,580**	4,650	**6,310**	221,500	**98,500**	2.88	0.31	**3.81**	0.09	**1.14**
3.250	**82.55**	1.000	**25.40**	25.53	**38.00**	3,990	**5,420**	7,030	**9,540**	329,500	**146,500**	2.76	0.39	**4.85**	0.04	**0.51**
3.250	**82.55**	1.250	**31.75**	24.03	**35.76**	3,380	**4,590**	5,960	**8,080**	280,900	**124,900**	2.95	0.37	**4.56**	0.06	**0.79**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
API NC23																
3.250	**82.55**	1.500	**38.10**	22.19	**33.03**	2,640	**3,580**	4,650	**6,310**	221,500	**98,500**	3.38	0.34	**4.21**	0.09	**1.14**
API NC26 2 3/8 IF 2 7/8 SH																
3.375	**85.73**	1.250	**31.75**	26.24	**39.05**	3,580 *	**4,850**	6,300	**8,540**	408,000	**181,500**	1.87	0.40	**4.98**	0.06	**0.79**
3.375	**85.73**	1.500	**38.10**	24.41	**36.32**	3,580 *	**4,850**	6,300	**8,540**	348,600	**155,000**	2.02	0.37	**4.63**	0.09	**1.14**
3.375	**85.73**	1.750	**44.45**	22.24	**33.09**	3,580 *	**4,850**	6,300	**8,540**	278,400	**123,800**	2.30	0.34	**4.22**	0.12	**1.55**
3.500	**88.90**	1.250	**31.75**	28.54	**42.47**	4,600 *	**6,240**	8,100	**10,990**	408,000	**181,500**	2.20	0.44	**5.42**	0.06	**0.79**
3.500	**88.90**	1.500	**38.10**	26.70	**39.73**	4,600 *	**6,240**	8,100	**10,990**	348,600	**155,000**	2.37	0.41	**5.07**	0.09	**1.14**
3.500	**88.90**	1.750	**44.45**	24.53	**36.51**	3,690	**5,010**	6,500	**8,820**	278,400	**123,800**	2.71	0.37	**4.66**	0.12	**1.55**
3.750	**95.25**	1.250	**31.75**	33.38	**49.67**	5,500	**7,450**	9,680	**13,120**	408,000	**181,500**	2.91	0.51	**6.33**	0.06	**0.79**
3.750	**95.25**	1.375	**34.93**	32.50	**48.36**	5,100	**6,910**	8,980	**12,170**	379,700	**168,900**	3.00	0.50	**6.17**	0.08	**0.96**
3.750	**95.25**	1.500	**38.10**	31.54	**46.94**	4,660	**6,320**	8,210	**11,130**	348,600	**155,000**	3.13	0.48	**5.99**	0.09	**1.14**
3.750	**95.25**	1.750	**44.45**	29.37	**43.71**	3,690	**5,010**	6,500	**8,820**	278,400	**123,800**	3.58	0.45	**5.57**	0.12	**1.55**
API NC 31 2 7/8 IF 3 1/2 SH																
3.875	**98.43**	1.250	**31.75**	35.92	**53.45**	4,630 *	**6,290**	8,160	**11,070**	577,900	**257,000**	1.50	0.55	**6.82**	0.06	**0.79**
3.875	**98.43**	1.500	**38.10**	34.08	**50.72**	4,630 *	**6,290**	8,160	**11,070**	577,900	**257,000**	1.55	0.52	**6.47**	0.09	**1.14**
3.875	**98.43**	1.750	**44.45**	31.91	**47.49**	4,630 *	**6,290**	8,160	**11,070**	524,400	**233,300**	1.64	0.49	**6.06**	0.12	**1.55**
3.875	**98.43**	2.000	**50.80**	29.41	**43.77**	4,630 *	**6,290**	8,160	**11,070**	443,400	**197,200**	1.81	0.45	**5.58**	0.16	**2.03**
4.125	**104.78**	1.250	**31.75**	41.26	**61.40**	7,380 *	**10,010**	13,000	**17,630**	654,000	**290,900**	1.99	0.63	**7.83**	0.06	**0.79**
4.125	**104.78**	1.500	**38.10**	39.42	**58.67**	7,380 *	**10,010**	13,000	**17,630**	594,600	**264,500**	2.06	0.60	**7.48**	0.09	**1.14**
4.125	**104.78**	1.750	**44.45**	37.25	**55.44**	7,380 *	**10,010**	13,000	**17,630**	524,400	**233,300**	2.18	0.57	**7.07**	0.12	**1.55**
4.125	**104.78**	2.000	**50.80**	34.75	**51.72**	6,850	**9,290**	12,060	**16,350**	443,400	**197,200**	2.39	0.53	**6.60**	0.16	**2.03**
4.375	**111.13**	1.250	**31.75**	46.93	**69.84**	10,280	**13,940**	18,100	**24,540**	654,000	**290,900**	2.53	0.72	**8.91**	0.06	**0.79**
4.375	**111.13**	1.500	**38.10**	45.10	**67.11**	9,300	**12,610**	16,380	**22,200**	594,600	**264,500**	2.62	0.69	**8.56**	0.09	**1.14**
4.375	**111.13**	1.750	**44.45**	42.93	**63.88**	8,160	**11,060**	14,360	**19,470**	524,400	**233,300**	2.77	0.66	**8.15**	0.12	**1.55**
4.375	**111.13**	2.000	**50.80**	40.43	**60.16**	6,850	**9,290**	12,060	**16,350**	443,400	**197,200**	3.04	0.62	**7.67**	0.16	**2.03**
4.500	**114.30**	1.250	**31.75**	49.90	**74.25**	10,280	**13,940**	18,100	**24,540**	654,000	**290,900**	2.83	0.76	**9.47**	0.06	**0.79**
4.500	**114.30**	1.500	**38.10**	48.06	**71.52**	9,300	**12,610**	16,380	**22,200**	594,600	**264,500**	2.92	0.73	**9.12**	0.09	**1.14**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
API NC 31 — 2 7/8 IF — 3 1/2 SH																
4.500	**114.30**	1.750	**44.45**	45.89	**68.29**	8,160	**11,060**	14,360	**19,470**	524,400	**233,300**	3.09	0.70	**8.71**	0.12	**1.55**
4.500	**114.30**	2.000	**50.80**	43.39	**64.57**	6,850	**9,290**	12,060	**16,350**	443,400	**197,200**	3.39	0.66	**8.23**	0.16	**2.03**
API NC 35																
4.500	**114.30**	1.750	**44.45**	45.89	**68.29**	9,030 *	**12,250**	15,900	**21,560**	716,600	**318,700**	1.92	0.70	**8.71**	0.12	**1.55**
4.500	**114.30**	2.000	**50.80**	43.39	**64.57**	9,030 *	**12,250**	15,900	**21,560**	635,600	**282,700**	2.03	0.66	**8.23**	0.16	**2.03**
4.500	**114.30**	2.250	**57.15**	40.55	**60.35**	9,030 *	**12,250**	15,900	**21,560**	543,800	**241,900**	2.22	0.62	**7.70**	0.21	**2.57**
4.750	**120.65**	1.750	**44.45**	52.07	**77.48**	12,270	**16,630**	21,600	**29,280**	716,600	**318,700**	2.40	0.80	**9.88**	0.12	**1.55**
4.750	**120.65**	2.000	**50.80**	49.56	**73.76**	10,820	**14,670**	19,050	**25,830**	635,600	**282,700**	2.54	0.76	**9.41**	0.16	**2.03**
4.750	**120.65**	2.250	**57.15**	46.73	**69.53**	9,200	**12,470**	16,190	**21,950**	543,800	**241,900**	2.78	0.71	**8.87**	0.21	**2.57**
5.000	**127.00**	1.750	**44.45**	58.57	**87.17**	12,270	**16,630**	21,600	**29,280**	716,600	**318,700**	2.94	0.90	**11.12**	0.12	**1.55**
5.000	**127.00**	2.000	**50.80**	56.07	**83.44**	10,820	**14,670**	19,050	**25,830**	635,600	**282,700**	3.11	0.86	**10.64**	0.16	**2.03**
5.000	**127.00**	2.250	**57.15**	53.23	**79.22**	9,200	**12,470**	16,190	**21,950**	543,800	**241,900**	3.40	0.81	**10.10**	0.21	**2.57**
API NC 38 — 3 1/2 IF — 4 1/2 SH																
4.750	**120.65**	1.750	**44.45**	52.07	**77.48**	9,980 *	**13,530**	17,570	**23,820**	803,200	**357,200**	1.70	0.80	**9.88**	0.12	**1.55**
4.750	**120.65**	2.000	**50.80**	49.56	**73.76**	9,980 *	**13,530**	17,570	**23,820**	722,200	**321,200**	1.77	0.76	**9.41**	0.16	**2.03**
4.750	**120.65**	2.250	**57.15**	46.73	**69.53**	9,980 *	**13,530**	17,570	**23,820**	630,400	**280,400**	1.88	0.71	**8.87**	0.21	**2.57**
4.750	**120.65**	2.500	**63.50**	43.55	**64.82**	9,980 *	**13,530**	16,680	**22,610**	527,800	**234,700**	2.07	0.67	**8.27**	0.25	**3.17**
4.750	**120.65**	2.688	**68.26**	40.96	**60.95**	9,410	**12,760**	13,990	**18,970**	443,800	**197,400**	2.28	0.63	**7.77**	0.29	**3.66**
4.750	**120.65**	2.813	**71.44**	39.12	**58.22**	8,310	**11,270**	12,070	**16,370**	384,400	**170,900**	2.49	0.60	**7.42**	0.32	**4.01**
5.000	**127.00**	1.750	**44.45**	58.57	**87.17**	13,940 *	**18,910**	24,550	**33,280**	803,200	**357,200**	2.12	0.90	**11.12**	0.12	**1.55**
5.000	**127.00**	2.000	**50.80**	56.07	**83.44**	13,940 *	**18,910**	23,120	**31,350**	722,200	**321,200**	2.21	0.86	**10.64**	0.16	**2.03**
5.000	**127.00**	2.250	**57.15**	53.23	**79.22**	12,900	**17,500**	20,110	**27,270**	630,400	**280,400**	2.35	0.81	**10.10**	0.21	**2.57**
5.000	**127.00**	2.500	**63.50**	50.06	**74.50**	10,970	**14,880**	16,730	**22,690**	527,800	**234,700**	2.58	0.76	**9.50**	0.25	**3.17**
5.000	**127.00**	2.813	**71.44**	45.63	**67.90**	8,310	**11,270**	12,070	**16,370**	384,400	**170,900**	3.11	0.70	**8.66**	0.32	**4.01**
5.250	**133.35**	2.000	**50.80**	62.91	**93.62**	14,650	**19,860**	23,170	**31,420**	722,200	**321,200**	2.68	0.96	**11.94**	0.16	**2.03**
5.250	**133.35**	2.250	**57.15**	60.08	**89.40**	12,900	**17,500**	20,110	**27,270**	630,400	**280,400**	2.85	0.92	**11.40**	0.21	**2.57**
5.250	**133.35**	2.500	**63.50**	56.90	**84.68**	10,970	**14,880**	16,730	**22,690**	527,800	**234,700**	3.13	0.87	**10.80**	0.25	**3.17**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
API NC 38 — 3 1/2 IF — 4 1/2 SH																
5.500	**139.70**	2.250	**57.15**	67.25	**100.08**	12,900	**17,500**	20,110	**27,270**	630,400	**280,400**	3.41	1.03	**12.76**	0.21	**2.57**
5.500	**139.70**	2.500	**63.50**	64.08	**95.36**	10,970	**14,880**	16,730	**22,690**	527,800	**234,700**	3.74	0.98	**12.16**	0.25	**3.17**
5.500	**139.70**	2.813	**71.44**	59.65	**88.77**	8,310	**11,270**	12,070	**16,370**	384,400	**170,900**	4.51	0.91	**11.32**	0.32	**4.01**
API NC 40 — 4" FH — 4 1/2" DSL — 4" Mod.Open																
5.000	**127.00**	2.000	**50.80**	56.07	**83.44**	10,910 *	**14,790**	19,200	**26,030**	889,600	**395,700**	1.63	0.86	**10.64**	0.16	**2.03**
5.000	**127.00**	2.250	**57.15**	53.23	**79.22**	10,910 *	**14,790**	19,200	**26,030**	797,800	**354,900**	1.71	0.81	**10.10**	0.21	**2.57**
5.000	**127.00**	2.500	**63.50**	50.06	**74.50**	10,910 *	**14,790**	19,200	**26,030**	695,200	**309,200**	1.83	0.76	**9.50**	0.25	**3.17**
5.000	**127.00**	2.688	**68.26**	47.47	**70.64**	10,910 *	**14,790**	19,200	**26,030**	611,200	**271,800**	1.96	0.73	**9.01**	0.29	**3.66**
5.000	**127.00**	2.813	**71.44**	45.63	**67.90**	10,910 *	**14,790**	18,380	**24,920**	551,800	**245,400**	2.08	0.70	**8.66**	0.32	**4.01**
5.250	**133.35**	2.250	**57.15**	60.08	**89.40**	15,280 *	**20,730**	26,900	**36,480**	797,800	**354,900**	2.11	0.92	**11.40**	0.21	**2.57**
5.250	**133.35**	2.500	**63.50**	56.90	**84.68**	14,960	**20,290**	23,430	**31,770**	695,200	**309,200**	2.26	0.87	**10.80**	0.25	**3.17**
5.250	**133.35**	2.813	**71.45**	52.46	**78.08**	12,120	**16,430**	18,440	**25,000**	551,600	**245,300**	2.57	0.80	**9.96**	0.32	**4.01**
5.500	**139.70**	2.000	**50.80**	70.09	**104.30**	18,880	**25,600**	30,290	**41,080**	889,600	**395,700**	2.43	1.07	**13.30**	0.16	**2.03**
5.500	**139.70**	2.250	**57.15**	67.25	**100.08**	17,020	**23,080**	27,040	**36,660**	797,800	**354,900**	2.54	1.03	**12.76**	0.21	**2.57**
5.500	**139.70**	2.500	**63.50**	64.08	**95.36**	14,960	**20,290**	23,430	**31,770**	695,200	**309,200**	2.72	0.98	**12.16**	0.25	**3.17**
5.500	**139.70**	2.813	**71.45**	59.64	**88.75**	12,120	**16,430**	18,440	**25,000**	551,600	**245,300**	3.09	0.91	**11.32**	0.32	**4.01**
5.750	**146.05**	2.000	**50.80**	77.60	**115.48**	18,880	**25,600**	30,290	**41,080**	889,600	**395,700**	2.88	1.19	**14.73**	0.16	**2.03**
5.750	**146.05**	2.250	**57.15**	74.76	**111.26**	17,020	**23,080**	27,040	**36,660**	797,800	**354,900**	3.02	1.14	**14.19**	0.21	**2.57**
5.750	**146.05**	2.500	**63.50**	71.59	**106.54**	14,960	**20,290**	23,430	**31,770**	695,200	**309,200**	3.22	1.09	**13.59**	0.25	**3.17**
5.750	**146.05**	2.813	**71.45**	67.15	**99.93**	12,120	**16,430**	18,440	**25,000**	551,600	**245,300**	3.67	1.03	**12.74**	0.32	**4.01**
6.000	**152.40**	2.000	**50.80**	85.44	**127.15**	18,880	**25,600**	30,290	**41,080**	889,600	**395,700**	3.37	1.31	**16.21**	0.16	**2.03**
6.000	**152.40**	2.250	**57.15**	82.60	**122.93**	17,020	**23,080**	27,040	**36,660**	797,800	**354,900**	3.52	1.26	**15.68**	0.21	**2.57**
6.000	**152.40**	2.500	**63.50**	79.43	**118.21**	14,960	**20,290**	23,430	**31,770**	695,200	**309,200**	3.77	1.21	**15.07**	0.25	**3.17**
6.000	**152.40**	2.813	**71.45**	74.99	**111.60**	12,120	**16,430**	18,440	**25,000**	551,600	**245,300**	4.28	1.15	**14.23**	0.32	**4.01**
API NC 44																
5.750	**146.05**	2.000	**50.80**	77.60	**115.48**	20,890 *	**28,320**	36,770	**49,860**	1,169,300	**520,100**	2.01	1.19	**14.73**	0.16	**2.03**
5.750	**146.05**	2.250	**57.15**	74.76	**111.26**	20,890 *	**28,320**	36,770	**49,860**	1,077,500	**479,300**	2.08	1.14	**14.19**	0.21	**2.57**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
API NC 44																
5.750	**146.05**	2.500	**63.50**	71.59	**106.54**	20,890 *	**28,320**	35,550	**48,200**	974,900	**433,600**	2.17	1.09	**13.59**	0.25	**3.17**
5.750	**146.05**	2.813	**71.44**	67.16	**99.94**	18,160	**24,620**	30,140	**40,870**	831,500	**369,800**	2.37	1.03	**12.74**	0.32	**4.01**
6.000	**152.40**	2.000	**50.80**	85.44	**127.15**	25,500	**34,580**	43,050	**58,370**	1,169,300	**520,100**	2.39	1.31	**16.21**	0.16	**2.03**
6.000	**152.40**	2.250	**57.15**	82.60	**122.93**	23,490	**31,850**	39,510	**53,570**	1,077,500	**479,300**	2.47	1.26	**15.68**	0.21	**2.57**
6.000	**152.40**	2.500	**63.50**	79.43	**118.21**	21,250	**28,820**	35,580	**48,240**	974,900	**433,600**	2.58	1.21	**15.07**	0.25	**3.17**
6.000	**152.40**	2.813	**71.44**	75.00	**111.61**	18,160	**24,620**	30,140	**40,870**	831,500	**369,800**	2.81	1.15	**14.23**	0.32	**4.01**
6.250	**158.75**	2.000	**50.80**	93.62	**139.32**	25,500	**34,580**	43,050	**58,370**	1,169,300	**520,100**	2.80	1.43	**17.77**	0.16	**2.03**
6.250	**158.75**	2.250	**57.15**	90.78	**135.10**	23,490	**31,850**	39,510	**53,570**	1,077,500	**479,300**	2.89	1.39	**17.23**	0.21	**2.57**
6.250	**158.75**	2.500	**63.50**	87.61	**130.38**	21,250	**28,820**	35,580	**48,240**	974,900	**433,600**	3.02	1.34	**16.63**	0.25	**3.17**
6.250	**158.75**	2.813	**71.44**	83.18	**123.78**	18,160	**24,620**	30,140	**40,870**	831,500	**369,800**	3.29	1.27	**15.79**	0.32	**4.01**
6.500	**165.10**	2.000	**50.20**	102.13	**151.98**	25,500	**34,580**	43,050	**58,370**	1,169,300	**520,100**	3.23	1.56	**19.38**	0.16	**2.03**
6.500	**165.10**	2.250	**57.15**	99.29	**147.76**	23,490	**31,850**	39,510	**53,570**	1,077,500	**479,300**	3.34	1.52	**18.84**	0.21	**2.57**
6.500	**165.10**	2.500	**63.50**	96.12	**143.04**	21,250	**28,820**	35,580	**48,240**	974,900	**433,600**	3.49	1.47	**18.24**	0.25	**3.17**
6.500	**165.10**	2.813	**71.44**	91.69	**136.45**	18,160	**24,620**	30,140	**40,870**	831,500	**369,800**	3.80	1.40	**17.40**	0.32	**4.01**
API NC 46				**4" IF**		**4 1/2 XH**		**4 1/2 Semi IF**		**5 DSL**		**4 1/2 Mod. Open**				
5.625	**142.88**	3.375	**85.73**	54.07	**80.46**	15,020 *	**20,370**	23,740	**32,190**	634,300	**282,100**	2.08	0.83	**10.26**	0.46	**5.77**
5.750	**146.05**	2.250	**57.15**	74.76	**111.26**	17,730 *	**24,040**	31,210	**42,320**	1,181,000	**525,300**	1.66	1.14	**14.19**	0.21	**2.57**
5.750	**146.05**	2.500	**63.50**	71.59	**106.54**	17,730 *	**24,040**	31,210	**42,320**	1,078,400	**479,700**	1.72	1.09	**13.59**	0.25	**3.17**
5.750	**146.05**	2.813	**71.44**	67.16	**99.94**	17,730 *	**24,040**	31,210	**42,320**	934,900	**415,900**	1.84	1.03	**12.74**	0.32	**4.01**
5.750	**146.05**	3.156	**80.17**	61.68	**91.79**	17,730 *	**24,040**	28,520	**38,660**	757,700	**337,000**	2.06	0.94	**11.71**	0.41	**5.05**
6.000	**152.40**	2.250	**57.15**	82.60	**122.93**	23,420 *	**31,750**	41,220	**55,880**	1,181,000	**525,300**	1.99	1.26	**15.68**	0.21	**2.57**
6.000	**152.40**	2.500	**63.50**	79.43	**118.21**	23,420 *	**31,750**	41,030	**55,640**	1,078,400	**479,700**	2.07	1.21	**15.07**	0.25	**3.17**
6.000	**152.40**	2.813	**71.44**	75.00	**111.61**	22,420	**30,400**	35,510	**48,150**	934,900	**415,900**	2.21	1.15	**14.23**	0.32	**4.01**
6.000	**152.40**	3.000	**76.20**	72.09	**107.28**	20,310	**27,530**	31,800	**43,120**	840,800	**374,000**	2.34	1.10	**13.68**	0.37	**4.56**
6.250	**158.75**	2.250	**57.15**	90.78	**135.10**	28,020	**37,990**	45,320	**61,440**	1,181,000	**525,300**	2.36	1.39	**17.23**	0.21	**2.57**
6.250	**158.75**	2.500	**63.50**	87.61	**130.38**	25,670	**34,810**	41,210	**55,870**	1,078,400	**479,700**	2.44	1.34	**16.63**	0.25	**3.17**
6.250	**158.75**	2.813	**71.44**	83.18	**123.78**	22,420	**30,400**	35,510	**48,150**	934,900	**415,900**	2.61	1.27	**15.79**	0.32	**4.01**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
API NC 46				**4" IF**		**4 1/2 XH**		**4 1/2 Semi IF**		**5 DSL**		**4 1/2 Mod. Open**				
6.250	**158.75**	3.000	**76.20**	80.27	**119.45**	20,310	**27,530**	31,800	**43,120**	840,800	**374,000**	2.77	1.23	**15.23**	0.37	**4.56**
6.500	**165.10**	2.250	**57.15**	99.29	**147.76**	28,020	**37,990**	45,320	**61,440**	1,181,000	**525,300**	2.74	1.52	**18.84**	0.21	**2.57**
6.500	**165.10**	2.500	**63.50**	96.12	**143.04**	25,670	**34,810**	41,210	**55,870**	1,078,400	**479,700**	2.85	1.47	**18.24**	0.25	**3.17**
6.500	**165.10**	2.813	**71.44**	91.69	**136.45**	22,420	**30,400**	35,510	**48,150**	934,900	**415,900**	3.05	1.40	**17.40**	0.32	**4.01**
6.500	**165.10**	3.000	**76.20**	88.78	**132.12**	20,310	**27,530**	31,800	**43,120**	840,800	**374,000**	3.22	1.36	**16.85**	0.37	**4.56**
6.750	**171.45**	2.250	**57.15**	108.14	**160.92**	28,020	**37,990**	45,320	**61,440**	1,181,000	**525,300**	3.16	1.65	**20.52**	0.21	**2.57**
6.750	**171.45**	2.500	**63.50**	104.96	**156.20**	25,670	**34,810**	41,210	**55,870**	1,078,400	**479,700**	3.28	1.60	**19.92**	0.25	**3.17**
6.750	**171.45**	2.813	**71.44**	100.53	**149.61**	22,420	**30,400**	35,510	**48,150**	934,900	**415,900**	3.51	1.54	**19.08**	0.32	**4.01**
6.750	**171.45**	3.000	**76.20**	97.62	**145.28**	20,310	**27,530**	31,800	**43,120**	840,800	**374,000**	3.71	1.49	**18.53**	0.37	**4.56**
API NC 50				**5 XH**		**5 Mod. Open**		**5 1/2 DSL**		**5 Semi IF**		**4 1/2 API IF**				
6.125	**155.58**	3.750	**95.25**	62.62	**93.19**	19,410	**26,310**	29,750	**40,330**	734,300	**326,600**	2.09	0.96	**11.88**	0.57	**7.13**
6.250	**158.75**	2.250	**57.15**	90.78	**135.10**	23,000 *	**31,180**	40,480	**54,890**	1,511,800	**672,500**	1.57	1.39	**17.23**	0.21	**2.57**
6.250	**158.75**	2.500	**63.50**	87.61	**130.38**	23,000 *	**31,180**	40,480	**54,890**	1,409,200	**626,800**	1.61	1.34	**16.63**	0.25	**3.17**
6.250	**158.75**	2.813	**71.44**	83.18	**123.78**	23,000 *	**31,180**	40,480	**54,890**	1,265,800	**563,000**	1.68	1.27	**15.79**	0.32	**4.01**
6.250	**158.75**	3.000	**76.20**	80.27	**119.45**	23,000 *	**31,180**	40,480	**54,890**	1,171,700	**521,200**	1.74	1.23	**15.23**	0.37	**4.56**
6.250	**158.75**	3.250	**82.55**	76.10	**113.24**	23,000 *	**31,180**	40,480	**54,890**	1,036,700	**461,100**	1.86	1.16	**14.44**	0.43	**5.35**
6.500	**165.10**	2.250	**57.15**	99.29	**147.76**	29,670 *	**40,230**	52,230	**70,820**	1,511,800	**672,500**	1.87	1.52	**18.84**	0.21	**2.57**
6.500	**165.10**	2.500	**63.50**	96.12	**143.04**	29,670 *	**40,230**	52,230	**70,820**	1,409,200	**626,800**	1.91	1.47	**18.24**	0.25	**3.17**
6.500	**165.10**	2.813	**71.44**	91.69	**136.45**	29,670 *	**40,230**	52,110	**70,650**	1,265,800	**563,000**	2.00	1.40	**17.40**	0.32	**4.01**
6.500	**165.10**	3.000	**76.20**	88.78	**132.12**	29,670 *	**40,230**	48,230	**65,390**	1,171,700	**521,200**	2.08	1.36	**16.85**	0.37	**4.56**
6.500	**165.10**	3.250	**82.55**	84.61	**125.91**	26,670	**36,160**	42,480	**57,600**	1,036,700	**461,100**	2.22	1.29	**16.06**	0.43	**5.35**
6.750	**171.45**	2.250	**57.15**	108.14	**160.92**	36,740 *	**49,810**	62,860	**85,230**	1,511,800	**672,500**	2.18	1.65	**20.52**	0.21	**2.57**
6.750	**171.45**	2.500	**63.50**	104.96	**156.20**	35,820	**48,570**	58,520	**79,350**	1,409,200	**626,800**	2.24	1.60	**19.92**	0.25	**3.17**
6.750	**171.45**	2.813	**71.44**	100.53	**149.61**	32,270	**43,760**	52,300	**70,920**	1,265,800	**563,000**	2.34	1.54	**19.08**	0.32	**4.01**
6.750	**171.45**	3.000	**76.20**	97.62	**145.28**	29,960	**40,620**	48,250	**65,420**	1,171,700	**521,200**	2.43	1.49	**18.53**	0.37	**4.56**
6.750	**171.45**	3.250	**82.55**	93.45	**139.07**	26,670	**36,160**	42,480	**57,600**	1,036,700	**461,100**	2.60	1.43	**17.73**	0.43	**5.35**
7.000	**177.80**	2.250	**57.15**	117.31	**174.58**	38,370	**52,030**	63,000	**85,420**	1,511,800	**672,500**	2.52	1.79	**22.26**	0.21	**2.57**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
API NC 50				**5 XH**		**5 Mod. Open**		**5 1/2 DSL**		**5 Semi IF**		**4 1/2 API IF**				
7.000	**177.80**	2.500	**63.50**	114.14	**169.86**	35,820	**48,570**	58,520	**79,350**	1,409,200	**626,800**	2.59	1.74	**21.66**	0.25	**3.17**
7.000	**177.80**	2.813	**71.44**	109.71	**163.27**	32,270	**43,760**	52,300	**70,920**	1,265,800	**563,000**	2.71	1.68	**20.82**	0.32	**4.01**
7.000	**177.80**	3.000	**76.20**	106.80	**158.94**	29,960	**40,620**	48,250	**65,420**	1,171,700	**521,200**	2.81	1.63	**20.27**	0.37	**4.56**
7.000	**177.80**	3.250	**82.55**	102.63	**152.73**	26,670	**36,160**	42,480	**57,600**	1,036,700	**461,100**	3.00	1.57	**19.48**	0.43	**5.35**
7.250	**184.15**	2.500	**63.50**	123.65	**184.02**	35,820	**48,570**	58,520	**79,350**	1,409,200	**626,800**	2.96	1.89	**23.47**	0.25	**3.17**
7.250	**184.15**	2.813	**71.44**	119.22	**177.42**	32,270	**43,760**	52,300	**70,920**	1,265,800	**563,000**	3.10	1.82	**22.63**	0.32	**4.01**
7.250	**184.15**	3.000	**76.20**	116.31	**173.09**	29,960	**40,620**	48,250	**65,420**	1,171,700	**521,200**	3.22	1.78	**22.07**	0.37	**4.56**
7.250	**184.15**	3.250	**82.55**	112.14	**166.88**	26,670	**36,160**	42,480	**57,600**	1,036,700	**461,100**	3.43	1.71	**21.28**	0.43	**5.35**
7.500	**190.50**	2.500	**63.50**	133.50	**198.67**	35,820	**48,570**	58,520	**79,350**	1,409,200	**626,800**	3.36	2.04	**25.34**	0.25	**3.17**
7.500	**190.50**	2.813	**71.44**	129.07	**192.07**	32,270	**43,760**	52,300	**70,920**	1,265,800	**563,000**	3.51	1.97	**24.49**	0.32	**4.01**
7.500	**190.50**	3.000	**76.20**	126.16	**187.74**	29,960	**40,620**	48,250	**65,420**	1,171,700	**521,200**	3.64	1.93	**23.94**	0.37	**4.56**
7.500	**190.50**	3.250	**82.55**	121.99	**181.53**	26,670	**36,160**	42,480	**57,600**	1,036,700	**461,100**	3.89	1.86	**23.15**	0.43	**5.35**
API NC56																
7.250	**184.15**	2.500	**63.50**	123.65	**184.02**	40,490 *	**54,900**	64,790	**87,850**	1,712,700	**761,800**	2.02	1.89	**23.47**	0.25	**3.17**
7.250	**184.15**	2.813	**71.44**	119.22	**177.42**	40,490 *	**54,900**	64,790	**87,850**	1,582,300	**703,800**	2.08	1.82	**22.63**	0.32	**4.01**
7.250	**184.15**	3.000	**76.20**	116.31	**173.09**	40,490 *	**54,900**	64,790	**87,850**	1,496,700	**665,700**	2.13	1.78	**22.07**	0.37	**4.56**
7.250	**184.15**	3.250	**82.55**	112.14	**166.88**	40,490 *	**54,900**	61,560	**83,460**	1,374,000	**611,100**	2.22	1.71	**21.28**	0.43	**5.35**
7.500	**190.50**	2.500	**63.50**	133.50	**198.67**	49,060 *	**66,510**	77,450	**105,010**	1,712,700	**761,800**	2.30	2.04	**25.34**	0.25	**3.17**
7.500	**190.50**	2.813	**71.44**	129.07	**192.07**	48,220	**65,370**	71,490	**96,930**	1,582,300	**703,800**	2.37	1.97	**24.49**	0.32	**4.01**
7.500	**190.50**	3.000	**76.20**	126.16	**187.74**	45,680	**61,930**	67,440	**91,440**	1,496,700	**665,700**	2.42	1.93	**23.94**	0.37	**4.56**
7.500	**190.50**	3.250	**82.55**	121.99	**181.53**	42,050	**57,020**	61,670	**83,610**	1,374,000	**611,100**	2.52	1.86	**23.15**	0.43	**5.35**
7.750	**196.85**	2.500	**63.50**	143.68	**213.82**	52,110	**70,650**	77,690	**105,340**	1,712,700	**761,800**	2.60	2.20	**27.27**	0.25	**3.17**
7.750	**196.85**	2.813	**71.44**	139.25	**207.22**	48,220	**65,370**	71,490	**96,930**	1,582,300	**703,800**	2.68	2.13	**26.43**	0.32	**4.01**
7.750	**196.85**	3.000	**76.20**	136.34	**202.89**	45,680	**61,930**	67,440	**91,440**	1,496,700	**665,700**	2.74	2.08	**25.87**	0.37	**4.56**
7.750	**196.85**	3.250	**82.55**	132.17	**196.68**	42,050	**57,020**	61,670	**83,610**	1,374,000	**611,100**	2.85	2.02	**25.08**	0.43	**5.35**
8.000	**203.20**	2.500	**63.50**	154.19	**229.46**	52,110	**70,650**	77,690	**105,340**	1,712,700	**761,800**	2.91	2.36	**29.26**	0.25	**3.17**
8.000	**203.20**	2.813	**71.44**	149.76	**222.87**	48,220	**65,370**	71,490	**96,930**	1,582,300	**703,800**	3.00	2.29	**28.42**	0.32	**4.01**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
API NC56																
8.000	**203.20**	3.000	**76.20**	146.85	**218.54**	45,680	**61,930**	67,440	**91,440**	1,496,700	**665,700**	3.07	2.24	**27.87**	0.37	**4.56**
8.000	**203.20**	3.250	**82.55**	142.68	**212.33**	42,050	**57,020**	61,670	**83,610**	1,374,000	**611,100**	3.19	2.18	**27.08**	0.43	**5.35**
API NC 61																
8.000	**203.20**	2.813	**71.44**	149.76	**222.87**	55,130 *	**74,740**	88,200	**119,590**	2,075,100	**923,000**	2.05	2.29	**28.42**	0.32	**4.01**
8.000	**203.20**	3.000	**76.20**	146.85	**218.54**	55,130 *	**74,740**	88,200	**119,590**	1,989,500	**885,000**	2.08	2.24	**27.87**	0.37	**4.56**
8.000	**203.20**	3.250	**82.55**	142.68	**212.33**	55,130 *	**74,740**	88,200	**119,590**	1,866,800	**830,400**	2.14	2.18	**27.08**	0.43	**5.35**
8.250	**209.55**	2.813	**71.44**	160.61	**239.01**	65,430 *	**88,720**	102,370	**138,800**	2,075,100	**923,000**	2.30	2.45	**30.48**	0.32	**4.01**
8.250	**209.55**	3.000	**76.20**	157.70	**234.68**	65,430 *	**88,720**	98,150	**133,070**	1,989,500	**885,000**	2.34	2.41	**29.93**	0.37	**4.56**
8.250	**209.55**	3.250	**82.55**	153.53	**228.47**	61,620 *	**83,550**	91,810	**124,480**	1,866,800	**830,400**	2.40	2.35	**29.14**	0.43	**5.35**
8.500	**215.90**	2.813	**71.44**	171.79	**255.65**	68,390	**92,730**	102,610	**139,120**	2,075,100	**923,000**	2.57	2.63	**32.60**	0.32	**4.01**
8.500	**215.90**	3.000	**76.20**	168.88	**251.32**	65,600	**88,950**	98,160	**133,090**	1,989,500	**885,000**	2.61	2.58	**32.05**	0.37	**4.56**
8.500	**215.90**	3.250	**82.55**	164.71	**245.11**	61,620	**83,550**	91,810	**124,480**	1,866,800	**830,400**	2.68	2.52	**31.26**	0.43	**5.35**
8.750	**222.25**	2.813	**71.44**	183.30	**272.78**	68,390	**92,730**	102,610	**139,120**	2,075,100	**923,000**	2.85	2.80	**34.79**	0.32	**4.01**
8.750	**222.25**	3.000	**76.20**	180.39	**268.45**	65,600	**88,950**	98,160	**133,090**	1,989,500	**885,000**	2.90	2.76	**34.23**	0.37	**4.56**
8.750	**222.25**	3.250	**82.55**	176.22	**262.24**	61,620	**83,550**	91,810	**124,480**	1,866,800	**830,400**	2.97	2.69	**33.44**	0.43	**5.35**
9.000	**228.60**	2.813	**71.44**	195.15	**290.42**	68,390	**92,730**	102,610	**139,120**	2,075,100	**923,000**	3.15	2.98	**37.04**	0.32	**4.01**
9.000	**228.60**	3.000	**76.20**	192.24	**286.08**	65,600	**88,950**	98,160	**133,090**	1,989,500	**885,000**	3.20	2.94	**36.48**	0.37	**4.56**
9.000	**228.60**	3.250	**82.55**	188.07	**279.88**	61,620	**83,550**	91,810	**124,480**	1,866,800	**830,400**	3.28	2.87	**35.69**	0.43	**5.35**
API NC 70																
9.000	**228.60**	2.813	**71.44**	195.15	**290.42**	75,780 *	**102,740**	121,240	**164,390**	2,940,600	**1,308,000**	1.87	2.98	**37.04**	0.32	**4.01**
9.000	**228.60**	3.000	**76.20**	192.24	**286.08**	75,780 *	**102,740**	121,240	**164,390**	2,855,000	**1,269,900**	1.89	2.94	**36.48**	0.37	**4.56**
9.000	**228.60**	3.250	**82.55**	188.07	**279.88**	75,780 *	**102,740**	121,240	**164,390**	2,732,300	**1,215,400**	1.92	2.87	**35.69**	0.43	**5.35**
9.000	**228.60**	3.500	**88.90**	183.56	**273.17**	75,780 *	**102,740**	121,240	**164,390**	2,599,800	**1,156,400**	1.95	2.80	**34.84**	0.50	**6.21**
9.250	**234.95**	2.813	**71.44**	207.33	**308.54**	88,800 *	**120,390**	142,080	**192,630**	2,940,600	**1,308,000**	2.08	3.17	**39.35**	0.32	**4.01**
9.250	**234.95**	3.000	**76.20**	204.42	**304.21**	88,800 *	**120,390**	142,080	**192,630**	2,855,000	**1,269,900**	2.10	3.12	**38.79**	0.37	**4.56**
9.250	**234.95**	3.250	**82.55**	200.25	**298.00**	88,800 *	**120,390**	142,080	**192,630**	2,732,300	**1,215,400**	2.13	3.06	**38.00**	0.43	**5.35**
9.250	**234.95**	3.500	**88.90**	195.74	**291.30**	88,800 *	**120,390**	142,080	**192,630**	2,599,800	**1,156,400**	2.17	2.99	**37.15**	0.50	**6.21**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	**mm**	in	**mm**	lb/ft	**kg/m**	ft.lb	**N.m**	ft.lb	**N.m**	lb	**daN**		gal/ft	**L/m**	gal/ft	**L/m**
API NC 70																
9.500	**241.30**	2.813	**71.44**	219.85	**327.17**	102,350 *	**138,770**	163,760	**222,030**	2,940,600	**1,308,000**	2.30	3.36	**41.72**	0.32	**4.01**
9.500	**241.30**	3.000	**76.20**	216.94	**322.84**	102,350 *	**138,770**	159,880	**216,770**	2,855,000	**1,269,900**	2.32	3.31	**41.17**	0.37	**4.56**
9.500	**241.30**	3.250	**82.55**	212.77	**316.63**	101,100	**137,080**	152,910	**207,320**	2,732,300	**1,215,400**	2.35	3.25	**40.38**	0.43	**5.35**
9.500	**241.30**	3.500	**88.90**	208.26	**309.93**	96,210 *	**130,440**	145,100	**196,740**	2,599,800	**1,156,400**	2.40	3.18	**39.52**	0.50	**6.21**
9.750	**247.65**	2.813	**71.44**	232.70	**346.29**	108,840	**147,560**	165,250	**224,050**	2,940,600	**1,308,000**	2.53	3.56	**44.16**	0.32	**4.01**
9.750	**247.65**	3.000	**76.20**	229.79	**341.96**	105,650	**143,250**	160,170	**217,160**	2,855,000	**1,269,900**	2.55	3.51	**43.61**	0.37	**4.56**
9.750	**247.65**	3.250	**82.55**	225.62	**335.75**	101,100	**137,080**	152,910	**207,320**	2,732,300	**1,215,400**	2.59	3.45	**42.82**	0.43	**5.35**
9.750	**247.65**	3.500	**88.90**	221.11	**329.05**	96,210	**130,440**	145,100	**196,740**	2,599,800	**1,156,400**	2.64	3.38	**41.96**	0.50	**6.21**
9.750	**247.65**	3.750	**95.25**	216.27	**321.85**	90,980	**123,350**	136,760	**185,420**	2,457,400	**1,093,100**	2.70	3.30	**41.04**	0.57	**7.13**
10.000	**254.00**	2.813	**71.44**	245.88	**365.91**	108,840	**147,560**	165,250	**224,050**	2,940,600	**1,308,000**	2.77	3.76	**46.66**	0.32	**4.01**
10.000	**254.00**	3.000	**76.20**	242.97	**361.58**	105,650	**143,250**	160,170	**217,160**	2,855,000	**1,269,900**	2.79	3.71	**46.11**	0.37	**4.56**
10.000	**254.00**	3.250	**82.55**	238.80	**355.37**	101,100	**137,080**	152,910	**207,320**	2,732,300	**1,215,400**	2.83	3.65	**45.32**	0.43	**5.35**
10.000	**254.00**	3.500	**88.90**	234.29	**348.67**	96,210	**130,440**	145,100	**196,740**	2,599,800	**1,156,400**	2.89	3.58	**44.46**	0.50	**6.21**
10.000	**254.00**	3.750	**95.25**	229.45	**341.46**	90,980	**123,350**	136,760	**185,420**	2,457,400	**1,093,100**	2.95	3.51	**43.55**	0.57	**7.13**
10.250	**260.35**	2.813	**71.44**	259.40	**386.02**	108,840	**147,560**	165,250	**224,050**	2,940,600	**1,308,000**	3.02	3.96	**49.23**	0.32	**4.01**
10.250	**260.35**	3.000	**76.20**	256.49	**381.69**	105,650	**143,250**	160,170	**217,160**	2,855,000	**1,269,900**	3.05	3.92	**48.68**	0.37	**4.56**
10.250	**260.35**	3.250	**82.55**	252.32	**375.49**	101,100	**137,080**	152,910	**207,320**	2,732,300	**1,215,400**	3.09	3.86	**47.88**	0.43	**5.35**
10.250	**260.35**	3.500	**88.90**	247.81	**368.78**	96,210	**130,440**	145,100	**196,740**	2,599,800	**1,156,400**	3.15	3.79	**47.03**	0.50	**6.21**
10.250	**260.35**	3.750	**95.25**	242.97	**361.58**	90,980	**123,350**	136,760	**185,420**	2,457,400	**1,093,100**	3.22	3.71	**46.11**	0.57	**7.13**
API NC 77																
10.000	**254.00**	2.813	**71.44**	245.88	**365.91**	108,190 *	**146,690**	173,110	**234,700**	3,705,000	**1,648,000**	1.94	3.76	**46.66**	0.32	**4.01**
10.000	**254.00**	3.000	**76.20**	242.97	**361.58**	108,190 *	**146,690**	173,110	**234,700**	3,619,400	**1,610,000**	1.95	3.71	**46.11**	0.37	**4.56**
10.000	**254.00**	3.250	**82.55**	238.80	**355.37**	108,190 *	**146,690**	173,110	**234,700**	3,496,700	**1,555,400**	1.97	3.65	**45.32**	0.43	**5.35**
10.000	**254.00**	3.500	**88.90**	234.29	**348.67**	108,190 *	**146,690**	173,110	**234,700**	3,364,100	**1,496,400**	1.99	3.58	**44.46**	0.50	**6.21**
10.250	**260.35**	2.500	**63.50**	263.83	**392.62**	124,050 *	**168,190**	198,480	**269,100**	3,835,400	**1,706,000**	2.11	4.03	**50.07**	0.25	**3.17**
10.250	**260.35**	2.813	**71.44**	259.40	**386.02**	124,050 *	**168,190**	198,480	**269,100**	3,705,000	**1,648,000**	2.13	3.96	**49.23**	0.32	**4.01**
10.250	**260.35**	3.000	**76.20**	256.49	**381.69**	124,050 *	**168,190**	198,480	**269,100**	3,619,400	**1,610,000**	2.14	3.92	**48.68**	0.37	**4.56**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
API NC 77																
10.250	**260.35**	3.250	**82.55**	252.32	**375.49**	124,050 *	**168,190**	198,480	**269,100**	3,496,700	**1,555,400**	2.16	3.86	**47.88**	0.43	**5.35**
10.250	**260.35**	3.500	**88.90**	247.81	**368.78**	124,050 *	**168,190**	198,480	**269,100**	3,364,100	**1,496,400**	2.19	3.79	**47.03**	0.50	**6.21**
10.500	**266.70**	2.500	**63.50**	277.68	**413.23**	140,490 *	**190,480**	224,780	**304,760**	3,835,400	**1,706,000**	2.31	4.24	**52.70**	0.25	**3.17**
10.500	**266.70**	2.813	**71.44**	273.25	**406.64**	140,490 *	**190,480**	224,780	**304,760**	3,705,000	**1,648,000**	2.33	4.18	**51.86**	0.32	**4.01**
10.500	**266.70**	3.000	**76.20**	270.34	**402.31**	140,490 *	**190,480**	221,580	**300,430**	3,619,400	**1,610,000**	2.34	4.13	**51.30**	0.37	**4.56**
10.500	**266.70**	3.250	**82.55**	266.17	**396.10**	140,480	**190,470**	214,070	**290,240**	3,496,700	**1,555,400**	2.36	4.07	**50.51**	0.43	**5.35**
10.500	**266.70**	3.500	**88.90**	261.66	**389.39**	135,110	**183,190**	205,500	**278,630**	3,364,100	**1,496,400**	2.39	4.00	**49.66**	0.50	**6.21**
10.750	**273.05**	2.813	**71.44**	287.43	**427.75**	148,960	**201,970**	227,600	**308,580**	3,705,000	**1,648,000**	2.53	4.39	**54.55**	0.32	**4.01**
10.750	**273.05**	3.000	**76.20**	284.52	**423.42**	145,470	**197,230**	222,030	**301,040**	3,619,400	**1,610,000**	2.55	4.35	**54.00**	0.37	**4.56**
10.750	**273.05**	3.250	**82.55**	280.35	**417.21**	140,480	**190,470**	214,070	**290,240**	3,496,700	**1,555,400**	2.57	4.28	**53.20**	0.43	**5.35**
10.750	**273.05**	3.500	**88.90**	275.84	**410.50**	135,110	**183,190**	205,500	**278,630**	3,364,100	**1,496,400**	2.61	4.22	**52.35**	0.50	**6.21**
11.000	**279.40**	2.813	**71.44**	301.95	**449.35**	148,960	**201,970**	227,600	**308,580**	3,705,000	**1,648,000**	2.75	4.61	**57.30**	0.32	**4.01**
11.000	**279.40**	3.000	**76.20**	299.04	**445.02**	145,470	**197,230**	222,030	**301,040**	3,619,400	**1,610,000**	2.77	4.57	**56.75**	0.37	**4.56**
11.000	**279.40**	3.250	**82.55**	294.87	**438.81**	140,480	**190,470**	214,070	**290,240**	3,496,700	**1,555,400**	2.79	4.51	**55.96**	0.43	**5.35**
11.000	**279.40**	3.500	**88.90**	290.36	**432.11**	135,110	**183,190**	205,500	**278,630**	3,364,100	**1,496,400**	2.83	4.44	**55.10**	0.50	**6.21**
11.000	**279.40**	3.750	**95.25**	285.52	**424.91**	129,370	**175,400**	196,340	**266,200**	3,221,800	**1,433,100**	2.87	4.36	**54.19**	0.57	**7.13**
API 5 1/2 IF																
7.375	**187.33**	4.813	**122.24**	83.39	**124.09**	31,520	**42,740**	44,170	**59,880**	906,200	**403,100**	2.03	1.27	**15.82**	0.94	**11.74**
8.000	**203.20**	2.813	**71.44**	149.76	**222.87**	56,640 *	**76,790**	90,620	**122,870**	2,104,000	**935,900**	1.85	2.29	**28.42**	0.32	**4.01**
8.000	**203.20**	3.000	**76.20**	146.85	**218.54**	56,640 *	**76,790**	90,620	**122,870**	2,018,400	**897,800**	1.87	2.24	**27.87**	0.37	**4.56**
8.000	**203.20**	3.250	**82.55**	142.68	**212.33**	56,640 *	**76,790**	90,620	**122,870**	1,895,700	**843,200**	1.92	2.18	**27.08**	0.43	**5.35**
8.000	**203.20**	3.500	**88.90**	138.17	**205.62**	56,640 *	**76,790**	87,840	**119,100**	1,763,100	**784,300**	1.98	2.11	**26.22**	0.50	**6.21**
8.250	**209.55**	2.813	**71.44**	160.61	**239.01**	67,130 *	**91,020**	105,700	**143,310**	2,104,000	**935,900**	2.10	2.45	**30.48**	0.32	**4.01**
8.250	**209.55**	3.000	**76.20**	157.70	**234.68**	67,130 *	**91,020**	101,400	**137,480**	2,018,400	**897,800**	2.13	2.41	**29.93**	0.37	**4.56**
8.250	**209.55**	3.250	**82.55**	153.53	**228.47**	63,380	**85,930**	94,960	**128,740**	1,895,700	**843,200**	2.19	2.35	**29.14**	0.43	**5.35**
8.250	**209.55**	3.500	**88.90**	149.02	**221.77**	59,020	**80,020**	88,010	**119,330**	1,763,100	**784,300**	2.26	2.28	**28.28**	0.50	**6.21**
8.500	**215.90**	2.813	**71.44**	171.79	**255.65**	70,270	**95,280**	105,950	**143,660**	2,104,000	**935,900**	2.37	2.63	**32.60**	0.32	**4.01**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
API 5 1/2 IF																
8.500	**215.90**	3.000	**76.20**	168.88	**251.32**	67,430	**91,430**	101,420	**137,510**	2,018,400	**897,800**	2.41	2.58	**32.05**	0.37	**4.56**
8.500	**215.90**	3.250	**82.55**	164.71	**245.11**	63,380	**85,930**	94,960	**128,740**	1,895,700	**843,200**	2.47	2.52	**31.26**	0.43	**5.35**
8.500	**215.90**	3.500	**88.90**	160.20	**238.40**	59,020	**80,020**	88,010	**119,330**	1,763,100	**784,300**	2.55	2.45	**30.40**	0.50	**6.21**
8.750	**222.25**	2.813	**71.44**	183.30	**272.78**	70,270	**95,280**	105,950	**143,660**	2,104,000	**935,900**	2.66	2.80	**34.79**	0.32	**4.01**
8.750	**222.25**	3.000	**76.20**	180.39	**268.45**	67,430	**91,430**	101,420	**137,510**	2,018,400	**897,800**	2.70	2.76	**34.23**	0.37	**4.56**
8.750	**222.25**	3.250	**82.55**	176.22	**262.24**	63,380	**85,930**	94,960	**128,740**	1,895,700	**843,200**	2.76	2.69	**33.44**	0.43	**5.35**
8.750	**222.25**	3.500	**88.90**	171.71	**255.54**	59,020	**80,020**	88,010	**119,330**	1,763,100	**784,300**	2.85	2.62	**32.59**	0.50	**6.21**
9.000	**228.60**	2.813	**71.44**	195.15	**290.42**	70,270	**95,280**	105,950	**143,660**	2,104,000	**935,900**	2.95	2.98	**37.04**	0.32	**4.01**
9.000	**228.60**	3.000	**76.20**	192.24	**286.08**	67,430	**91,430**	101,420	**137,510**	2,018,400	**897,800**	3.00	2.94	**36.48**	0.37	**4.56**
9.000	**228.60**	3.250	**82.55**	188.07	**279.88**	63,380	**85,930**	94,960	**128,740**	1,895,700	**843,200**	3.07	2.87	**35.69**	0.43	**5.35**
9.000	**228.60**	3.500	**88.90**	183.56	**273.17**	59,020	**80,020**	88,010	**119,330**	1,763,100	**784,300**	3.17	2.80	**34.84**	0.50	**6.21**
9.250	**234.95**	2.813	**71.44**	207.33	**308.54**	70,270	**95,280**	105,950	**143,660**	2,104,000	**935,900**	3.27	3.17	**39.35**	0.32	**4.01**
9.250	**234.95**	3.000	**76.20**	204.42	**304.21**	67,430	**91,430**	101,420	**137,510**	2,018,400	**897,800**	3.32	3.12	**38.79**	0.37	**4.56**
9.250	**234.95**	3.250	**82.55**	200.25	**298.00**	63,380	**85,930**	94,960	**128,740**	1,895,700	**843,200**	3.40	3.06	**38.00**	0.43	**5.35**
9.250	**234.95**	3.500	**88.90**	195.74	**291.30**	59,020	**80,020**	88,010	**119,330**	1,763,100	**784,300**	3.51	2.99	**37.15**	0.50	**6.21**
API 6 5/8 IF																
8.375	**212.73**	5.500	**139.70**	106.51	**158.50**	21,360 *	**28,960**	34,170	**46,330**	1,421,200	**632,200**	1.52	1.63	**20.21**	1.23	**15.33**
8.375	**212.73**	5.750	**146.05**	99.00	**147.33**	21,360 *	**28,960**	34,170	**46,330**	1,200,300	**533,900**	1.71	1.51	**18.79**	1.35	**16.75**
8.375	**212.73**	5.906	**150.02**	94.14	**140.09**	21,360 *	**28,960**	31,530	**42,750**	1,057,300	**470,300**	1.87	1.44	**17.86**	1.42	**17.68**
8.500	**215.90**	5.250	**133.35**	119.32	**177.56**	24,440 *	**33,140**	39,110	**53,030**	1,632,300	**726,000**	1.51	1.82	**22.64**	1.12	**13.97**
8.500	**215.90**	5.500	**139.70**	112.14	**166.88**	24,440 *	**33,140**	39,110	**53,030**	1,421,200	**632,200**	1.66	1.71	**21.28**	1.23	**15.33**
8.500	**215.90**	5.750	**146.05**	104.63	**155.71**	24,440 *	**33,140**	35,790	**48,530**	1,200,300	**533,900**	1.86	1.60	**19.86**	1.35	**16.75**
8.500	**215.90**	5.906	**150.02**	99.77	**148.47**	22,520	**30,530**	31,530	**42,750**	1,057,300	**470,300**	2.04	1.52	**18.93**	1.42	**17.68**
9.000	**228.60**	5.250	**133.35**	142.68	**212.33**	33,240	**45,060**	48,670	**65,990**	1,632,300	**726,000**	2.02	2.18	**27.08**	1.12	**13.97**
9.000	**228.60**	5.500	**139.70**	135.50	**201.65**	29,300	**39,730**	42,380	**57,460**	1,421,200	**632,200**	2.22	2.07	**25.72**	1.23	**15.33**
9.000	**228.60**	5.750	**146.05**	127.99	**190.47**	25,180	**34,150**	35,790	**48,530**	1,200,300	**533,900**	2.50	1.96	**24.29**	1.35	**16.75**
9.000	**228.60**	5.906	**150.02**	123.13	**183.24**	22,520	**30,530**	31,530	**42,750**	1,057,300	**470,300**	2.73	1.88	**23.37**	1.42	**17.68**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
2 3/8 API Reg																
3.000	**76.20**	1.000	**25.40**	21.36	**31.79**	2,240 *	**3,030**	3,940	**5,340**	332,400	**147,800**	2.17	0.33	**4.05**	0.04	**0.51**
3.000	**76.20**	1.250	**31.75**	19.86	**29.55**	2,240 *	**3,030**	3,940	**5,340**	283,800	**126,200**	2.31	0.30	**3.77**	0.06	**0.79**
3.000	**76.20**	1.500	**38.10**	18.02	**26.82**	2,240 *	**3,030**	3,940	**5,340**	224,400	**99,800**	2.64	0.28	**3.42**	0.09	**1.14**
3.125	**79.38**	1.250	**31.75**	21.90	**32.59**	3,020 *	**4,100**	5,320	**7,220**	283,800	**126,200**	2.70	0.33	**4.16**	0.06	**0.79**
3.125	**79.38**	1.500	**38.10**	20.07	**29.86**	2,570	**3,480**	4,530	**6,140**	224,400	**99,800**	3.09	0.31	**3.81**	0.09	**1.14**
3.250	**82.55**	1.250	**31.75**	24.03	**35.76**	3,280	**4,450**	5,780	**7,830**	283,800	**126,200**	3.12	0.37	**4.56**	0.06	**0.79**
3.250	**82.55**	1.500	**38.10**	22.19	**33.03**	2,570	**3,480**	4,530	**6,140**	224,400	**99,800**	3.56	0.34	**4.21**	0.09	**1.14**
2 7/8 API Reg																
3.500	**88.90**	1.250	**31.75**	28.54	**42.47**	3,830 *	**5,200**	6,750	**9,150**	438,600	**195,100**	2.24	0.44	**5.42**	0.06	**0.79**
3.500	**88.90**	1.500	**38.10**	26.70	**39.73**	3,830 *	**5,200**	6,750	**9,150**	379,200	**168,700**	2.39	0.41	**5.07**	0.09	**1.14**
3.750	**95.25**	1.250	**31.75**	33.38	**49.67**	5,760	**7,810**	10,140	**13,750**	438,600	**195,100**	2.87	0.51	**6.33**	0.06	**0.79**
3.750	**95.25**	1.500	**38.10**	31.54	**46.94**	4,950	**6,710**	8,710	**11,810**	379,200	**168,700**	3.07	0.48	**5.99**	0.09	**1.14**
3.875	**98.43**	1.250	**31.75**	35.92	**53.45**	5,760	**7,810**	10,140	**13,750**	438,600	**195,100**	3.22	0.55	**6.82**	0.06	**0.79**
3.875	**98.43**	1.500	**38.10**	34.08	**50.72**	4,950	**6,710**	8,710	**11,810**	379,200	**168,700**	3.44	0.52	**6.47**	0.09	**1.14**
3 1/2 API Reg.																
4.125	**104.78**	1.250	**31.75**	41.26	**61.40**	6,460 *	**8,760**	11,370	**15,420**	682,600	**303,600**	2.06	0.63	**7.83**	0.06	**0.79**
4.125	**104.78**	1.500	**38.10**	39.42	**58.67**	6,460 *	**8,760**	11,370	**15,420**	623,200	**277,200**	2.13	0.60	**7.48**	0.09	**1.14**
4.125	**104.78**	1.750	**44.45**	37.25	**55.44**	6,460 *	**8,760**	11,370	**15,420**	553,000	**245,900**	2.24	0.57	**7.07**	0.12	**1.55**
4.250	**107.95**	1.250	**31.75**	44.06	**65.56**	7,880 *	**10,690**	13,870	**18,810**	682,600	**303,600**	2.31	0.67	**8.36**	0.06	**0.79**
4.250	**107.95**	1.500	**38.10**	42.22	**62.83**	7,880 *	**10,690**	13,870	**18,810**	623,200	**277,200**	2.38	0.65	**8.01**	0.09	**1.14**
4.250	**107.95**	1.750	**44.45**	40.05	**59.60**	7,880 *	**10,690**	13,870	**18,810**	553,000	**245,900**	2.51	0.61	**7.60**	0.12	**1.55**
4.250	**107.95**	2.000	**50.80**	37.55	**55.88**	7,110	**9,640**	12,520	**16,970**	472,000	**209,900**	2.73	0.57	**7.13**	0.16	**2.03**
4.500	**114.30**	1.250	**31.75**	49.90	**74.25**	10,470	**14,190**	18,420	**24,980**	682,600	**303,600**	2.84	0.76	**9.47**	0.06	**0.79**
4.500	**114.30**	1.500	**38.10**	48.06	**71.52**	9,510	**12,890**	16,740	**22,700**	623,200	**277,200**	2.92	0.73	**9.12**	0.09	**1.14**
4.500	**114.30**	1.750	**44.45**	45.89	**68.29**	8,390	**11,380**	14,770	**20,020**	553,000	**245,900**	3.08	0.70	**8.71**	0.12	**1.55**
4.500	**114.30**	2.000	**50.80**	43.39	**64.57**	7,110	**9,640**	12,520	**16,970**	472,000	**209,900**	3.36	0.66	**8.23**	0.16	**2.03**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
4 1/2 API Regular																
5.500	**139.70**	1.750	**44.45**	72.59	**108.03**	15,570 *	**21,110**	27,410	**37,160**	1,128,500	**501,900**	1.87	1.11	**13.78**	0.12	**1.55**
5.500	**139.70**	2.000	**50.80**	70.09	**104.30**	15,570 *	**21,110**	27,410	**37,160**	1,047,500	**465,900**	1.91	1.07	**13.30**	0.16	**2.03**
5.500	**139.70**	2.250	**57.15**	67.25	**100.08**	15,570 *	**21,110**	27,410	**37,160**	955,700	**425,100**	1.98	1.03	**12.76**	0.21	**2.57**
5.500	**139.70**	2.500	**63.50**	64.08	**95.36**	15,570 *	**21,110**	27,410	**37,160**	853,100	**379,500**	2.07	0.98	**12.16**	0.25	**3.17**
5.750	**146.05**	1.750	**44.45**	80.10	**119.20**	20,600 *	**27,940**	36,270	**49,170**	1,128,500	**501,900**	2.22	1.22	**15.20**	0.12	**1.55**
5.750	**146.05**	2.000	**50.80**	77.60	**115.48**	20,600 *	**27,940**	36,270	**49,170**	1,047,500	**465,900**	2.27	1.19	**14.73**	0.16	**2.03**
5.750	**146.05**	2.250	**57.15**	74.76	**111.26**	20,600 *	**27,940**	33,550	**45,480**	955,700	**425,100**	2.34	1.14	**14.19**	0.21	**2.57**
5.750	**146.05**	2.500	**63.50**	71.59	**106.54**	19,600	**26,570**	29,880	**40,510**	853,100	**379,500**	2.46	1.09	**13.59**	0.25	**3.17**
6.000	**152.40**	1.750	**44.45**	87.94	**130.87**	25,400	**34,440**	40,030	**54,280**	1,128,500	**501,900**	2.60	1.34	**16.69**	0.12	**1.55**
6.000	**152.40**	2.000	**50.80**	85.44	**127.15**	23,680	**32,110**	37,020	**50,200**	1,047,500	**465,900**	2.65	1.31	**16.21**	0.16	**2.03**
6.000	**152.40**	2.250	**57.15**	82.60	**122.93**	21,740	**29,480**	33,630	**45,600**	955,700	**425,100**	2.74	1.26	**15.68**	0.21	**2.57**
6.000	**152.40**	2.500	**63.50**	79.43	**118.21**	19,600	**26,570**	29,880	**40,510**	853,100	**379,500**	2.88	1.21	**15.07**	0.25	**3.17**
6.250	**158.75**	1.750	**44.45**	96.12	**143.04**	25,400	**34,440**	40,030	**54,280**	1,128,500	**501,900**	3.00	1.47	**18.24**	0.12	**1.55**
6.250	**158.75**	2.000	**50.80**	93.62	**139.32**	23,680	**32,110**	37,020	**50,200**	1,047,500	**465,900**	3.07	1.43	**17.77**	0.16	**2.03**
6.250	**158.75**	2.250	**57.15**	90.78	**135.10**	21,740	**29,480**	33,630	**45,600**	955,700	**425,100**	3.17	1.39	**17.23**	0.21	**2.57**
6.250	**158.75**	2.500	**63.50**	87.61	**130.38**	19,600	**26,570**	29,880	**40,510**	853,100	**379,500**	3.33	1.34	**16.63**	0.25	**3.17**
5 1/2 API Regular																
6.750	**171.45**	2.250	**57.15**	108.14	**160.92**	31,940 *	**43,300**	56,210	**76,210**	1,602,600	**712,900**	2.04	1.65	**20.52**	0.21	**2.57**
6.750	**171.45**	2.500	**63.50**	104.96	**156.20**	31,940 *	**43,300**	56,210	**76,210**	1,500,100	**667,200**	2.09	1.60	**19.92**	0.25	**3.17**
6.750	**171.45**	2.750	**69.85**	101.46	**150.99**	31,940 *	**43,300**	56,210	**76,210**	1,386,700	**616,800**	2.15	1.55	**19.25**	0.31	**3.83**
6.750	**171.45**	2.813	**71.44**	100.53	**149.61**	31,940 *	**43,300**	56,210	**76,210**	1,356,600	**603,400**	2.17	1.54	**19.08**	0.32	**4.01**
6.750	**171.45**	3.000	**76.20**	97.62	**145.28**	31,940 *	**43,300**	53,050	**71,930**	1,262,500	**561,500**	2.24	1.49	**18.53**	0.37	**4.56**
6.750	**171.45**	3.250	**82.55**	93.45	**139.07**	30,490	**41,340**	47,280	**64,110**	1,127,500	**501,500**	2.37	1.43	**17.73**	0.43	**5.35**
7.000	**177.80**	2.250	**57.15**	117.31	**174.58**	39,410 *	**53,440**	61,830	**83,830**	1,456,900	**648,100**	2.35	1.79	**22.26**	0.21	**2.57**
7.000	**177.80**	2.500	**63.50**	114.14	**169.86**	39,410 *	**53,440**	57,870	**78,470**	1,363,700	**606,600**	2.40	1.74	**21.66**	0.25	**3.17**
7.000	**177.80**	2.813	**71.44**	109.71	**163.27**	36,230	**49,120**	52,120	**70,670**	1,233,300	**548,600**	2.50	1.68	**20.82**	0.32	**4.01**
7.000	**177.80**	3.000	**76.20**	106.80	**158.94**	33,860	**45,910**	48,350	**65,560**	1,147,700	**510,500**	2.58	1.63	**20.27**	0.37	**4.56**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
5 1/2 API Regular																
7.000	**177.80**	3.250	**82.55**	102.63	**152.73**	30,490	**41,340**	42,990	**58,280**	1,025,000	**455,900**	2.72	1.57	**19.48**	0.43	**5.35**
7.250	**184.15**	2.250	**57.15**	126.83	**188.74**	42,480	**57,590**	62,070	**84,160**	1,456,900	**648,100**	2.67	1.94	**24.07**	0.21	**2.57**
7.250	**184.15**	2.500	**63.50**	123.65	**184.02**	39,860	**54,050**	57,910	**78,510**	1,363,700	**606,600**	2.73	1.89	**23.47**	0.25	**3.17**
7.250	**184.15**	2.813	**71.44**	119.22	**177.42**	36,230	**49,120**	52,120	**70,670**	1,233,300	**548,600**	2.84	1.82	**22.63**	0.32	**4.01**
7.250	**184.15**	3.000	**76.20**	116.31	**173.09**	33,860	**45,910**	48,350	**65,560**	1,147,700	**510,500**	2.93	1.78	**22.07**	0.37	**4.56**
7.250	**184.15**	3.250	**82.55**	112.14	**166.88**	30,490	**41,340**	42,990	**58,280**	1,025,000	**455,900**	3.10	1.71	**21.28**	0.43	**5.35**
7.500	**190.50**	2.250	**57.15**	136.67	**203.39**	42,480	**57,590**	62,070	**84,160**	1,456,900	**648,100**	3.02	2.09	**25.94**	0.21	**2.57**
7.500	**190.50**	2.500	**63.50**	133.50	**198.67**	39,860	**54,050**	57,910	**78,510**	1,363,700	**606,600**	3.09	2.04	**25.34**	0.25	**3.17**
7.500	**190.50**	2.813	**71.44**	129.07	**192.07**	36,230	**49,120**	52,120	**70,670**	1,233,300	**548,600**	3.21	1.97	**24.49**	0.32	**4.01**
7.500	**190.50**	3.000	**76.20**	126.16	**187.74**	33,860	**45,910**	48,350	**65,560**	1,147,700	**510,500**	3.32	1.93	**23.94**	0.37	**4.56**
7.500	**190.50**	3.250	**82.55**	121.99	**181.53**	30,490	**41,340**	42,990	**58,280**	1,025,000	**455,900**	3.51	1.86	**23.15**	0.43	**5.35**
6 5/8 API Regular																
7.500	**190.50**	2.500	**63.50**	133.50	**198.67**	46,390 *	**62,900**	74,230	**100,650**	1,817,900	**808,600**	1.94	2.04	**25.34**	0.25	**3.17**
7.500	**190.50**	2.813	**71.44**	129.07	**192.07**	46,390 *	**62,900**	74,230	**100,650**	1,687,500	**750,600**	1.99	1.97	**24.49**	0.32	**4.01**
7.500	**190.50**	3.000	**76.20**	126.16	**187.74**	46,390 *	**62,900**	74,230	**100,650**	1,601,900	**712,500**	2.03	1.93	**23.94**	0.37	**4.56**
7.500	**190.50**	3.250	**82.55**	121.99	**181.53**	46,390 *	**62,900**	69,040	**93,610**	1,479,200	**657,900**	2.10	1.86	**23.15**	0.43	**5.35**
7.750	**196.85**	2.500	**63.50**	143.68	**213.82**	55,620 *	**75,420**	85,610	**116,070**	1,817,900	**808,600**	2.22	2.20	**27.27**	0.25	**3.17**
7.750	**196.85**	2.813	**71.44**	139.25	**207.22**	53,340	**72,320**	79,300	**107,520**	1,687,500	**750,600**	2.28	2.13	**26.43**	0.32	**4.01**
7.750	**196.85**	3.000	**76.20**	136.34	**202.89**	50,700	**68,740**	75,090	**101,810**	1,601,900	**712,500**	2.33	2.08	**25.87**	0.37	**4.56**
7.750	**196.85**	3.250	**82.55**	132.17	**196.68**	46,930	**63,630**	69,080	**93,660**	1,479,200	**657,900**	2.41	2.02	**25.08**	0.43	**5.35**
7.750	**196.85**	3.500	**88.90**	127.66	**189.98**	42,890	**58,150**	62,640	**84,930**	1,346,700	**599,000**	2.52	1.95	**24.23**	0.50	**6.21**
8.000	**203.20**	2.500	**63.50**	154.19	**229.46**	57,390	**77,810**	85,750	**116,270**	1,817,900	**808,600**	2.52	2.36	**29.26**	0.25	**3.17**
8.000	**203.20**	2.813	**71.44**	149.76	**222.87**	53,340	**72,320**	79,300	**107,520**	1,687,500	**750,600**	2.59	2.29	**28.42**	0.32	**4.01**
8.000	**203.20**	3.000	**76.20**	146.85	**218.54**	50,700	**68,740**	75,090	**101,810**	1,601,900	**712,500**	2.64	2.24	**27.87**	0.37	**4.56**
8.000	**203.20**	3.250	**82.55**	142.68	**212.33**	46,930	**63,630**	69,080	**93,660**	1,479,200	**657,900**	2.73	2.18	**27.08**	0.43	**5.35**
8.250	**209.55**	2.500	**63.50**	165.04	**245.61**	57,390	**77,810**	85,750	**116,270**	1,817,900	**808,600**	2.84	2.52	**31.32**	0.25	**3.17**
8.250	**209.55**	2.813	**71.44**	160.61	**239.01**	53,340	**72,320**	79,300	**107,520**	1,687,500	**750,600**	2.91	2.45	**30.48**	0.32	**4.01**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
6 5/8 API Regular																
8.250	**209.55**	3.000	**76.20**	157.70	**234.68**	50,700	**68,740**	75,090	**101,810**	1,601,900	**712,500**	2.97	2.41	**29.93**	0.37	**4.56**
8.250	**209.55**	3.250	**82.55**	153.53	**228.47**	46,930	**63,630**	69,080	**93,660**	1,479,200	**657,900**	3.08	2.35	**29.14**	0.43	**5.35**
7 5/8 API Regular																
8.500	**215.90**	2.500	**63.50**	176.22	**262.24**	60,400 *	**81,890**	96,640	**131,020**	2,732,400	**1,215,400**	1.78	2.69	**33.44**	0.25	**3.17**
8.500	**215.90**	2.813	**71.44**	171.79	**255.65**	60,400 *	**81,890**	96,640	**131,020**	2,602,000	**1,157,400**	1.80	2.63	**32.60**	0.32	**4.01**
8.500	**215.90**	3.000	**76.20**	168.88	**251.32**	60,400 *	**81,890**	96,640	**131,020**	2,516,400	**1,119,300**	1.82	2.58	**32.05**	0.37	**4.56**
8.500	**215.90**	3.250	**82.55**	164.71	**245.11**	60,400 *	**81,890**	96,640	**131,020**	2,393,700	**1,064,700**	1.86	2.52	**31.26**	0.43	**5.35**
8.500	**215.90**	3.500	**88.90**	160.20	**238.40**	60,400 *	**81,890**	96,640	**131,020**	2,261,100	**1,005,800**	1.90	2.45	**30.40**	0.50	**6.21**
8.500	**215.90**	3.750	**95.25**	155.36	**231.20**	60,400 *	**81,890**	96,640	**131,020**	2,118,800	**942,400**	1.96	2.37	**29.48**	0.57	**7.13**
8.750	**222.25**	2.500	**63.50**	187.73	**279.38**	72,160 *	**97,840**	115,470	**156,550**	2,732,400	**1,215,400**	2.00	2.87	**35.63**	0.25	**3.17**
8.750	**222.25**	2.813	**71.44**	183.30	**272.78**	72,160 *	**97,840**	115,470	**156,550**	2,602,000	**1,157,400**	2.03	2.80	**34.79**	0.32	**4.01**
8.750	**222.25**	3.000	**76.20**	180.39	**268.45**	72,160 *	**97,840**	115,470	**156,550**	2,516,400	**1,119,300**	2.05	2.76	**34.23**	0.37	**4.56**
8.750	**222.25**	3.250	**82.55**	176.22	**262.24**	72,160 *	**97,840**	115,470	**156,550**	2,393,700	**1,064,700**	2.09	2.69	**33.44**	0.43	**5.35**
8.750	**222.25**	3.500	**88.90**	171.71	**255.54**	72,160 *	**97,840**	115,470	**156,550**	2,261,100	**1,005,800**	2.13	2.62	**32.59**	0.50	**6.21**
8.750	**222.25**	3.750	**95.25**	166.88	**248.34**	72,160 *	**97,840**	113,010	**153,230**	2,118,800	**942,400**	2.20	2.55	**31.67**	0.57	**7.13**
8.875	**225.43**	4.000	**101.60**	167.58	**249.39**	69,200	**93,830**	104,690	**141,950**	1,966,600	**874,800**	2.41	2.56	**31.80**	0.65	**8.11**
9.000	**228.60**	2.500	**63.50**	199.58	**297.01**	84,440 *	**114,480**	135,100	**183,180**	2,732,400	**1,215,400**	2.23	3.05	**37.88**	0.25	**3.17**
9.000	**228.60**	2.813	**71.44**	195.15	**290.42**	84,440 *	**114,480**	135,100	**183,180**	2,602,000	**1,157,400**	2.26	2.98	**37.04**	0.32	**4.01**
9.000	**228.60**	3.000	**76.20**	192.24	**286.08**	84,440 *	**114,480**	135,100	**183,180**	2,516,400	**1,119,300**	2.29	2.94	**36.48**	0.37	**4.56**
9.000	**228.60**	3.250	**82.55**	188.07	**279.88**	84,220	**114,180**	128,660	**174,440**	2,393,700	**1,064,700**	2.33	2.87	**35.69**	0.43	**5.35**
9.000	**228.60**	3.500	**88.90**	183.56	**273.17**	79,530	**107,830**	121,180	**164,300**	2,261,100	**1,005,800**	2.38	2.80	**34.84**	0.50	**6.21**
9.000	**228.60**	3.750	**95.25**	178.72	**265.97**	74,520	**101,040**	113,190	**153,460**	2,118,800	**942,400**	2.45	2.73	**33.92**	0.57	**7.13**
9.250	**234.95**	2.500	**63.50**	211.76	**315.14**	96,300	**130,560**	147,940	**200,580**	2,732,400	**1,215,400**	2.47	3.24	**40.19**	0.25	**3.17**
9.250	**234.95**	2.813	**71.44**	207.33	**308.54**	91,630	**124,230**	140,490	**190,480**	2,602,000	**1,157,400**	2.51	3.17	**39.35**	0.32	**4.01**
9.250	**234.95**	3.000	**76.20**	204.42	**304.21**	88,580	**120,090**	135,620	**183,870**	2,516,400	**1,119,300**	2.53	3.12	**38.79**	0.37	**4.56**
9.250	**234.95**	3.250	**82.55**	200.25	**298.00**	84,220	**114,180**	128,660	**174,440**	2,393,700	**1,064,700**	2.58	3.06	**38.00**	0.43	**5.35**
9.250	**234.95**	3.500	**88.90**	195.74	**291.30**	79,530	**107,830**	121,180	**164,300**	2,261,100	**1,005,800**	2.64	2.99	**37.15**	0.50	**6.21**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
7 5/8 API Regular																
9.250	**234.95**	3.750	**95.25**	190.91	**284.10**	74,520	**101,040**	113,190	**153,460**	2,118,800	**942,400**	2.72	2.92	**36.23**	0.57	**7.13**
9.500	**241.30**	2.500	**63.50**	224.28	**333.77**	96,300	**130,560**	147,940	**200,580**	2,732,400	**1,215,400**	2.73	3.43	**42.56**	0.25	**3.17**
9.500	**241.30**	2.813	**71.44**	219.85	**327.17**	91,630	**124,230**	140,490	**190,480**	2,602,000	**1,157,400**	2.77	3.36	**41.72**	0.32	**4.01**
9.500	**241.30**	3.000	**76.20**	216.94	**322.84**	88,580	**120,090**	135,620	**183,870**	2,516,400	**1,119,300**	2.80	3.31	**41.17**	0.37	**4.56**
9.500	**241.30**	3.250	**82.55**	212.77	**316.63**	84,220	**114,180**	128,660	**174,440**	2,393,700	**1,064,700**	2.85	3.25	**40.38**	0.43	**5.35**
9.500	**241.30**	3.500	**88.90**	208.26	**309.93**	79,530	**107,830**	121,180	**164,300**	2,261,100	**1,005,800**	2.91	3.18	**39.52**	0.50	**6.21**
9.500	**241.30**	3.750	**95.25**	203.42	**302.72**	74,520	**101,040**	113,190	**153,460**	2,118,800	**942,400**	3.00	3.11	**38.60**	0.57	**7.13**
8 5/8 API Regular																
10.000	**254.00**	2.813	**71.44**	245.88	**365.91**	109,340 *	**148,250**	174,950	**237,200**	3,560,500	**1,583,800**	1.95	3.76	**46.66**	0.32	**4.01**
10.000	**254.00**	3.000	**76.20**	242.97	**361.58**	109,340 *	**148,250**	174,950	**237,200**	3,474,900	**1,545,700**	1.96	3.71	**46.11**	0.37	**4.56**
10.000	**254.00**	3.250	**82.55**	238.80	**355.37**	109,340 *	**148,250**	174,950	**237,200**	3,352,200	**1,491,100**	1.98	3.65	**45.32**	0.43	**5.35**
10.000	**254.00**	3.500	**88.90**	234.29	**348.67**	109,340 *	**148,250**	174,950	**237,200**	3,219,600	**1,432,100**	2.01	3.58	**44.46**	0.50	**6.21**
10.000	**254.00**	3.750	**95.25**	229.45	**341.46**	109,340 *	**148,250**	174,950	**237,200**	3,077,300	**1,368,800**	2.04	3.51	**43.55**	0.57	**7.13**
10.000	**254.00**	4.750	**120.65**	206.76	**307.69**	98,410	**133,430**	145,360	**197,080**	2,409,700	**1,071,900**	2.29	3.16	**39.24**	0.92	**11.43**
10.250	**260.35**	2.813	**71.44**	259.40	**386.02**	125,260 *	**169,830**	200,420	**271,730**	3,560,500	**1,583,800**	2.15	3.96	**49.23**	0.32	**4.01**
10.250	**260.35**	3.000	**76.20**	256.49	**381.69**	125,260 *	**169,830**	200,420	**271,730**	3,474,900	**1,545,700**	2.17	3.92	**48.68**	0.37	**4.56**
10.250	**260.35**	3.250	**82.55**	252.32	**375.49**	125,260 *	**169,830**	200,420	**271,730**	3,352,200	**1,491,100**	2.19	3.86	**47.88**	0.43	**5.35**
10.250	**260.35**	3.500	**88.90**	247.81	**368.78**	125,260 *	**169,830**	196,510	**266,430**	3,219,600	**1,432,100**	2.22	3.79	**47.03**	0.50	**6.21**
10.250	**260.35**	3.750	**95.25**	242.97	**361.58**	125,030	**169,520**	187,800	**254,620**	3,077,300	**1,368,800**	2.25	3.71	**46.11**	0.57	**7.13**
10.500	**266.70**	2.813	**71.44**	273.25	**406.64**	141,760 *	**192,200**	218,790	**296,640**	3,560,500	**1,583,800**	2.36	4.18	**51.86**	0.32	**4.01**
10.500	**266.70**	3.000	**76.20**	270.34	**402.31**	141,130	**191,350**	213,480	**289,440**	3,474,900	**1,545,700**	2.38	4.13	**51.30**	0.37	**4.56**
10.500	**266.70**	3.250	**82.55**	266.17	**396.10**	136,140	**184,580**	205,520	**278,650**	3,352,200	**1,491,100**	2.40	4.07	**50.51**	0.43	**5.35**
10.500	**266.70**	3.500	**88.90**	261.66	**389.39**	130,770	**177,300**	196,960	**267,040**	3,219,600	**1,432,100**	2.43	4.00	**49.66**	0.50	**6.21**
10.500	**266.70**	3.750	**95.25**	256.82	**382.19**	125,030	**169,520**	187,800	**254,620**	3,077,300	**1,368,800**	2.47	3.92	**48.74**	0.57	**7.13**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
7 5/8 API Regular Low Torque Face																
8.875	**225.43**	2.813	**71.44**	189.18	**281.54**	54,040 *	**73,270**	86,460	**117,230**	2,602,000	**1,157,400**	2.14	2.89	**35.90**	0.32	**4.01**
8.875	**225.43**	4.000	**101.60**	167.58	**249.39**	54,040 *	**73,270**	86,460	**117,230**	1,966,600	**874,800**	2.41	2.56	**31.80**	0.65	**8.11**
9.250	**234.95**	2.813	**71.44**	207.33	**308.54**	73,090 *	**99,100**	116,950	**158,570**	2,602,000	**1,157,400**	2.51	3.17	**39.35**	0.32	**4.01**
9.250	**234.95**	3.000	**76.20**	204.42	**304.21**	73,090 *	**99,100**	116,950	**158,570**	2,516,400	**1,119,300**	2.53	3.12	**38.79**	0.37	**4.56**
9.250	**234.95**	3.250	**82.55**	200.25	**298.00**	73,090 *	**99,100**	116,950	**158,570**	2,393,700	**1,064,700**	2.58	3.06	**38.00**	0.43	**5.35**
9.250	**234.95**	3.500	**88.90**	195.74	**291.30**	73,090 *	**99,100**	116,950	**158,570**	2,261,100	**1,005,800**	2.64	2.99	**37.15**	0.50	**6.21**
9.250	**234.95**	3.750	**95.25**	190.91	**284.10**	73,090 *	**99,100**	116,950	**158,570**	2,118,800	**942,400**	2.72	2.92	**36.23**	0.57	**7.13**
9.500	**241.30**	2.813	**71.44**	219.85	**327.17**	86,460 *	**117,220**	138,340	**187,560**	2,602,000	**1,157,400**	2.77	3.36	**41.72**	0.32	**4.01**
9.500	**241.30**	3.000	**76.20**	216.94	**322.84**	86,460 *	**117,220**	138,340	**187,560**	2,516,400	**1,119,300**	2.80	3.31	**41.17**	0.37	**4.56**
9.500	**241.30**	3.250	**82.55**	212.77	**316.63**	86,460 *	**117,220**	133,290	**180,720**	2,393,700	**1,064,700**	2.85	3.25	**40.38**	0.43	**5.35**
9.500	**241.30**	3.500	**88.90**	208.26	**309.93**	82,450	**111,790**	125,630	**170,330**	2,261,100	**1,005,800**	2.91	3.18	**39.52**	0.50	**6.21**
9.500	**241.30**	3.750	**95.25**	203.42	**302.72**	77,280	**104,780**	117,380	**159,150**	2,118,800	**942,400**	3.00	3.11	**38.60**	0.57	**7.13**
9.750	**247.65**	2.813	**71.44**	232.70	**346.29**	94,930	**128,710**	145,550	**197,350**	2,602,000	**1,157,400**	3.04	3.56	**44.16**	0.32	**4.01**
9.750	**247.65**	3.000	**76.20**	229.79	**341.96**	91,780	**124,440**	140,530	**190,530**	2,516,400	**1,119,300**	3.07	3.51	**43.61**	0.37	**4.56**
9.750	**247.65**	3.250	**82.55**	225.62	**335.75**	87,290	**118,350**	133,350	**180,800**	2,393,700	**1,064,700**	3.13	3.45	**42.82**	0.43	**5.35**
9.750	**247.65**	3.500	**88.90**	221.11	**329.05**	82,450	**111,790**	125,630	**170,330**	2,261,100	**1,005,800**	3.20	3.38	**41.96**	0.50	**6.21**
9.750	**247.65**	3.750	**95.25**	216.27	**321.85**	77,280	**104,780**	117,380	**159,150**	2,118,800	**942,400**	3.29	3.30	**41.04**	0.57	**7.13**
10.000	**254.00**	2.813	**71.44**	245.88	**365.91**	94,930	**128,710**	145,550	**197,350**	2,602,000	**1,157,400**	3.32	3.76	**46.66**	0.32	**4.01**
10.000	**254.00**	3.000	**76.20**	242.97	**361.58**	91,780	**124,440**	140,530	**190,530**	2,516,400	**1,119,300**	3.36	3.71	**46.11**	0.37	**4.56**
10.000	**254.00**	3.250	**82.55**	238.80	**355.37**	87,290	**118,350**	133,350	**180,800**	2,393,700	**1,064,700**	3.42	3.65	**45.32**	0.43	**5.35**
10.000	**254.00**	3.500	**88.90**	234.29	**348.67**	82,450	**111,790**	125,630	**170,330**	2,261,100	**1,005,800**	3.50	3.58	**44.46**	0.50	**6.21**
10.000	**254.00**	3.750	**95.25**	229.45	**341.46**	77,280	**104,780**	117,380	**159,150**	2,118,800	**942,400**	3.60	3.51	**43.55**	0.57	**7.13**
8 5/8 API Regular Low Torque Face																
10.000	**254.00**	4.750	**120.65**	206.76	**307.69**	63,140 *	**85,610**	101,020	**136,970**	2,409,700	**1,071,900**	2.29	3.16	**39.24**	0.92	**11.43**
10.750	**273.05**	3.000	**76.20**	284.52	**423.42**	112,880 *	**153,050**	180,610	**244,880**	3,474,900	**1,545,700**	2.60	4.35	**54.00**	0.37	**4.56**
10.750	**273.05**	3.250	**82.55**	280.35	**417.21**	112,880 *	**153,050**	180,610	**244,880**	3,352,200	**1,491,100**	2.62	4.28	**53.20**	0.43	**5.35**
10.750	**273.05**	3.500	**88.90**	275.84	**410.50**	112,880 *	**153,050**	180,610	**244,880**	3,219,600	**1,432,100**	2.66	4.22	**52.35**	0.50	**6.21**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
8 5/8 API Regular Low Torque Face																
10.750	**273.05**	3.750	**95.25**	271.01	**403.30**	112,880 *	**153,050**	180,610	**244,880**	3,077,300	**1,368,800**	2.70	4.14	**51.43**	0.57	**7.13**
11.000	**279.40**	3.000	**76.20**	299.04	**445.02**	130,670 *	**177,170**	209,080	**283,470**	3,474,900	**1,545,700**	2.83	4.57	**56.75**	0.37	**4.56**
11.000	**279.40**	3.250	**82.55**	294.87	**438.81**	130,670 *	**177,170**	209,080	**283,470**	3,352,200	**1,491,100**	2.85	4.51	**55.96**	0.43	**5.35**
11.000	**279.40**	3.500	**88.90**	290.36	**432.11**	130,670 *	**177,170**	205,640	**278,820**	3,219,600	**1,432,100**	2.89	4.44	**55.10**	0.50	**6.21**
11.000	**279.40**	3.750	**95.25**	285.52	**424.91**	130,670 *	**177,170**	196,550	**266,490**	3,077,300	**1,368,800**	2.94	4.36	**54.19**	0.57	**7.13**
11.250	**285.75**	3.000	**76.20**	313.89	**467.12**	147,610	**200,140**	223,280	**302,730**	3,474,900	**1,545,700**	3.06	4.80	**59.57**	0.37	**4.56**
11.250	**285.75**	3.250	**82.55**	309.72	**460.91**	142,420	**193,100**	215,010	**291,510**	3,352,200	**1,491,100**	3.10	4.73	**58.78**	0.43	**5.35**
11.250	**285.75**	3.500	**88.90**	305.21	**454.21**	136,840	**185,530**	206,100	**279,430**	3,219,600	**1,432,100**	3.14	4.66	**57.92**	0.50	**6.21**
11.250	**285.75**	3.750	**95.25**	300.38	**447.01**	130,870	**177,430**	196,570	**266,510**	3,077,300	**1,368,800**	3.19	4.59	**57.00**	0.57	**7.13**
2 7/8 XH							**3 1/2 DSL**		**2 7/8 Mod.Open**							
3.750	**95.25**	1.250	**31.75**	33.38	**49.67**	4,080 *	**5,540**	7,190	**9,750**	567,100	**252,200**	1.51	0.51	**6.33**	0.06	**0.79**
3.750	**95.25**	1.500	**38.10**	31.54	**46.94**	4,080 *	**5,540**	7,190	**9,750**	561,600	**249,800**	1.56	0.48	**5.99**	0.09	**1.14**
3.750	**95.25**	1.750	**44.45**	29.37	**43.71**	4,080 *	**5,540**	7,190	**9,750**	491,400	**218,500**	1.66	0.45	**5.57**	0.12	**1.55**
3.875	**98.43**	1.250	**31.75**	35.92	**53.45**	5,350 *	**7,250**	9,410	**12,770**	621,000	**276,200**	1.74	0.55	**6.82**	0.06	**0.79**
3.875	**98.43**	1.500	**38.10**	34.08	**50.72**	5,350 *	**7,250**	9,410	**12,770**	561,600	**249,800**	1.81	0.52	**6.47**	0.09	**1.14**
3.875	**98.43**	1.750	**44.45**	31.91	**47.49**	5,350 *	**7,250**	9,410	**12,770**	491,400	**218,500**	1.92	0.49	**6.06**	0.12	**1.55**
3.875	**98.43**	1.813	**46.04**	31.32	**46.61**	5,350 *	**7,250**	9,410	**12,770**	472,100	**210,000**	1.96	0.48	**5.94**	0.13	**1.66**
4.125	**104.78**	1.250	**31.75**	41.26	**61.40**	8,050 *	**10,920**	14,180	**19,230**	621,000	**276,200**	2.26	0.63	**7.83**	0.06	**0.79**
4.125	**104.78**	1.500	**38.10**	39.42	**58.67**	8,050 *	**10,920**	14,180	**19,230**	561,600	**249,800**	2.34	0.60	**7.48**	0.09	**1.14**
4.125	**104.78**	1.750	**44.45**	37.25	**55.44**	7,430	**10,070**	13,080	**17,730**	491,400	**218,500**	2.49	0.57	**7.07**	0.12	**1.55**
4.250	**107.95**	1.875	**47.63**	38.84	**57.80**	6,810	**9,240**	11,990	**16,260**	452,200	**201,100**	2.93	0.59	**7.37**	0.14	**1.78**
3 1/2 XH							**4 SH**		**3 1/2 Mod. OPEN**							
4.250	**107.95**	1.750	**44.45**	40.05	**59.60**	5,160 *	**6,990**	9,080	**12,310**	615,900	**273,900**	1.28	0.61	**7.60**	0.12	**1.55**
4.250	**107.95**	2.000	**50.80**	37.55	**55.88**	5,160 *	**6,990**	9,080	**12,310**	615,900	**273,900**	1.34	0.57	**7.13**	0.16	**2.03**
4.250	**107.95**	2.250	**57.15**	34.71	**51.65**	5,160 *	**6,990**	9,080	**12,310**	586,800	**261,000**	1.46	0.53	**6.59**	0.21	**2.57**
4.250	**107.95**	2.500	**63.50**	31.54	**46.94**	5,160 *	**6,990**	9,080	**12,310**	484,200	**215,400**	1.65	0.48	**5.99**	0.25	**3.17**
4.500	**114.30**	1.750	**44.45**	45.89	**68.29**	8,470 *	**11,490**	14,920	**20,230**	759,600	**337,900**	1.69	0.70	**8.71**	0.12	**1.55**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
3 1/2 XH							**4 SH**				**3 1/2 Mod. OPEN**					
4.500	**114.30**	2.000	**50.80**	43.39	**64.57**	8,470 *	**11,490**	14,920	**20,230**	678,600	**301,800**	1.78	0.66	**8.23**	0.16	**2.03**
4.500	**114.30**	2.250	**57.15**	40.55	**60.35**	8,470 *	**11,490**	14,920	**20,230**	586,800	**261,000**	1.93	0.62	**7.70**	0.21	**2.57**
4.500	**114.30**	2.500	**63.50**	37.38	**55.63**	8,310	**11,260**	14,620	**19,830**	484,200	**215,400**	2.19	0.57	**7.09**	0.25	**3.17**
4.750	**120.65**	1.750	**44.45**	52.07	**77.48**	12,070 *	**16,360**	21,240	**28,810**	759,600	**337,900**	2.15	0.80	**9.88**	0.12	**1.55**
4.750	**120.65**	2.000	**50.80**	49.56	**73.76**	11,800	**16,000**	20,770	**28,160**	678,600	**301,800**	2.27	0.76	**9.41**	0.16	**2.03**
4.750	**120.65**	2.250	**57.15**	46.73	**69.53**	10,140	**13,750**	17,850	**24,200**	586,800	**261,000**	2.46	0.71	**8.87**	0.21	**2.57**
4.750	**120.65**	2.438	**61.91**	44.38	**66.04**	8,780	**11,910**	15,460	**20,960**	510,900	**227,200**	2.68	0.68	**8.42**	0.24	**3.01**
4.750	**120.65**	2.500	**63.50**	43.55	**64.82**	8,310	**11,260**	14,620	**19,830**	484,200	**215,400**	2.78	0.67	**8.27**	0.25	**3.17**
5.000	**127.00**	1.750	**44.45**	58.57	**87.17**	13,280	**18,000**	23,370	**31,690**	759,600	**337,900**	2.65	0.90	**11.12**	0.12	**1.55**
5.000	**127.00**	2.000	**50.80**	56.07	**83.44**	11,800	**16,000**	20,770	**28,160**	678,600	**301,800**	2.79	0.86	**10.64**	0.16	**2.03**
5.000	**127.00**	2.250	**57.15**	53.23	**79.22**	10,140	**13,750**	17,850	**24,200**	586,800	**261,000**	3.03	0.81	**10.10**	0.21	**2.57**
5.000	**127.00**	2.500	**63.50**	50.06	**74.50**	8,310	**11,260**	14,620	**19,830**	484,200	**215,400**	3.43	0.76	**9.50**	0.25	**3.17**
5.250	**133.35**	1.750	**44.45**	65.42	**97.35**	13,280	**18,000**	23,370	**31,690**	759,600	**337,900**	3.20	1.00	**12.41**	0.12	**1.55**
5.250	**133.35**	2.000	**50.80**	62.91	**93.62**	11,800	**16,000**	20,770	**28,160**	678,600	**301,800**	3.37	0.96	**11.94**	0.16	**2.03**
5.250	**133.35**	2.250	**57.15**	60.08	**89.40**	10,140	**13,750**	17,850	**24,200**	586,800	**261,000**	3.65	0.92	**11.40**	0.21	**2.57**
5.250	**133.35**	2.500	**63.50**	56.90	**84.68**	8,310	**11,260**	14,620	**19,830**	484,200	**215,400**	4.14	0.87	**10.80**	0.25	**3.17**
2 7/8 API FH																
4.063	**103.19**	1.750	**44.45**	35.89	**53.41**	4,780 *	**6,480**	8,410	**11,400**	620,300	**275,900**	1.72	0.55	**6.81**	0.12	**1.55**
4.063	**103.19**	2.000	**50.80**	33.39	**49.68**	4,780 *	**6,480**	8,410	**11,400**	539,300	**239,900**	1.85	0.51	**6.34**	0.16	**2.03**
4.063	**103.19**	2.125	**53.98**	32.01	**47.63**	4,780 *	**6,480**	8,410	**11,400**	494,700	**220,000**	1.94	0.49	**6.07**	0.18	**2.29**
4.250	**107.95**	1.750	**44.45**	40.05	**59.60**	6,930 *	**9,400**	12,200	**16,540**	620,300	**275,900**	2.07	0.61	**7.60**	0.12	**1.55**
4.250	**107.95**	2.000	**50.80**	37.55	**55.88**	6,930 *	**9,400**	12,200	**16,540**	539,300	**239,900**	2.22	0.57	**7.13**	0.16	**2.03**
4.250	**107.95**	2.125	**53.98**	36.17	**53.83**	6,930 *	**9,400**	12,200	**16,540**	494,700	**220,000**	2.34	0.55	**6.86**	0.18	**2.29**
4.500	**114.30**	1.750	**44.45**	45.89	**68.29**	9,810	**13,300**	17,260	**23,410**	620,300	**275,900**	2.58	0.70	**8.71**	0.12	**1.55**
4.500	**114.30**	2.000	**50.80**	43.39	**64.57**	8,470	**11,490**	14,910	**20,220**	539,300	**239,900**	2.77	0.66	**8.23**	0.16	**2.03**
4.500	**114.30**	2.125	**53.98**	42.01	**62.52**	7,740	**10,500**	13,630	**18,480**	494,700	**220,000**	2.91	0.64	**7.97**	0.18	**2.29**
4.625	**117.48**	1.750	**44.45**	48.94	**72.82**	9,810	**13,300**	17,260	**23,410**	620,300	**275,900**	2.85	0.75	**9.29**	0.12	**1.55**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
2 7/8 API FH																
4.625	**117.48**	2.000	**50.80**	46.43	**69.10**	8,470	**11,490**	14,910	**20,220**	539,300	**239,900**	3.06	0.71	**8.81**	0.16	**2.03**
4.625	**117.48**	2.125	**53.98**	45.06	**67.05**	7,740	**10,500**	13,630	**18,480**	494,700	**220,000**	3.22	0.69	**8.55**	0.18	**2.29**
3 1/2 API FH																
4.500	**114.30**	2.250	**57.15**	40.55	**60.35**	6,750 *	**9,150**	11,880	**16,110**	574,200	**255,400**	1.82	0.62	**7.70**	0.21	**2.57**
4.500	**114.30**	2.438	**61.91**	38.20	**56.85**	6,750 *	**9,150**	11,880	**16,110**	498,300	**221,600**	1.96	0.58	**7.25**	0.24	**3.01**
4.500	**114.30**	2.500	**63.50**	37.38	**55.63**	6,750 *	**9,150**	11,880	**16,110**	471,600	**209,700**	2.01	0.57	**7.09**	0.25	**3.17**
4.625	**117.48**	2.250	**57.15**	43.60	**64.88**	8,480 *	**11,490**	14,920	**20,230**	574,200	**255,400**	2.04	0.67	**8.27**	0.21	**2.57**
4.625	**117.48**	2.500	**63.50**	40.43	**60.16**	8,480 *	**11,490**	14,130	**19,160**	471,600	**209,700**	2.26	0.62	**7.67**	0.25	**3.17**
5.000	**127.00**	2.250	**57.15**	53.23	**79.22**	11,430	**15,500**	17,400	**23,600**	574,200	**255,400**	2.76	0.81	**10.10**	0.21	**2.57**
5.000	**127.00**	2.500	**63.50**	50.06	**74.50**	9,600	**13,010**	14,190	**19,250**	471,600	**209,700**	3.06	0.76	**9.50**	0.25	**3.17**
4 1/2 API FH																
5.500	**139.70**	2.000	**50.80**	70.09	**104.30**	12,970 *	**17,580**	22,830	**30,950**	1,180,600	**525,100**	1.58	1.07	**13.30**	0.16	**2.03**
5.500	**139.70**	2.250	**57.15**	67.25	**100.08**	12,970 *	**17,580**	22,830	**30,950**	1,088,800	**484,300**	1.62	1.03	**12.76**	0.21	**2.57**
5.500	**139.70**	2.500	**63.50**	64.08	**95.36**	12,970 *	**17,580**	22,830	**30,950**	986,200	**438,700**	1.69	0.98	**12.16**	0.25	**3.17**
5.500	**139.70**	2.813	**71.44**	59.65	**88.77**	12,970 *	**17,580**	22,830	**30,950**	842,800	**374,900**	1.82	0.91	**11.32**	0.32	**4.01**
5.500	**139.70**	3.000	**76.20**	56.74	**84.43**	12,970 *	**17,580**	22,830	**30,950**	748,700	**333,000**	1.94	0.87	**10.77**	0.37	**4.56**
5.750	**146.05**	2.000	**50.80**	77.60	**115.48**	18,110 *	**24,560**	31,880	**43,230**	1,180,600	**525,100**	1.90	1.19	**14.73**	0.16	**2.03**
5.750	**146.05**	2.250	**57.15**	74.76	**111.26**	18,110 *	**24,560**	31,880	**43,230**	1,088,800	**484,300**	1.95	1.14	**14.19**	0.21	**2.57**
5.750	**146.05**	2.500	**63.50**	71.59	**106.54**	18,110 *	**24,560**	31,880	**43,230**	986,200	**438,700**	2.03	1.09	**13.59**	0.25	**3.17**
5.750	**146.05**	2.813	**71.44**	67.16	**99.94**	18,110 *	**24,560**	30,490	**41,340**	842,800	**374,900**	2.19	1.03	**12.74**	0.32	**4.01**
5.750	**146.05**	3.000	**76.20**	64.25	**95.61**	17,890	**24,260**	27,070	**36,710**	748,700	**333,000**	2.33	0.98	**12.19**	0.37	**4.56**
6.000	**152.40**	2.000	**50.80**	85.44	**127.15**	23,600 *	**32,000**	41,540	**56,320**	1,180,600	**525,100**	2.24	1.31	**16.21**	0.16	**2.03**
6.000	**152.40**	2.250	**57.15**	82.60	**122.93**	23,600 *	**32,000**	39,850	**54,030**	1,088,800	**484,300**	2.30	1.26	**15.68**	0.21	**2.57**
6.000	**152.40**	2.500	**63.50**	79.43	**118.21**	23,020	**31,220**	36,050	**48,880**	986,200	**438,700**	2.40	1.21	**15.07**	0.25	**3.17**
6.000	**152.40**	2.813	**71.44**	75.00	**111.61**	19,920	**27,000**	30,610	**41,500**	842,800	**374,900**	2.59	1.15	**14.23**	0.32	**4.01**
6.000	**152.40**	3.000	**76.20**	72.09	**107.28**	17,890	**24,260**	27,070	**36,710**	748,700	**333,000**	2.76	1.10	**13.68**	0.37	**4.56**
6.250	**158.75**	2.000	**50.80**	93.62	**139.32**	27,290	**37,000**	43,520	**59,010**	1,180,600	**525,100**	2.61	1.43	**17.77**	0.16	**2.03**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
4 1/2 API FH																
6.250	**158.75**	2.250	**57.15**	90.78	**135.10**	25,270	**34,260**	39,980	**54,200**	1,088,800	**484,300**	2.69	1.39	**17.23**	0.21	**2.57**
6.250	**158.75**	2.500	**63.50**	87.61	**130.38**	23,020	**31,220**	36,050	**48,880**	986,200	**438,700**	2.80	1.34	**16.63**	0.25	**3.17**
6.250	**158.75**	2.813	**71.44**	83.18	**123.78**	19,920	**27,000**	30,610	**41,500**	842,800	**374,900**	3.02	1.27	**15.79**	0.32	**4.01**
6.250	**158.75**	3.000	**76.20**	80.27	**119.45**	17,890	**24,260**	27,070	**36,710**	748,700	**333,000**	3.21	1.23	**15.23**	0.37	**4.56**
6.500	**165.10**	2.000	**50.80**	102.13	**151.98**	27,290	**37,000**	43,520	**59,010**	1,180,600	**525,100**	3.01	1.56	**19.38**	0.16	**2.03**
6.500	**165.10**	2.250	**57.15**	99.29	**147.76**	25,270	**34,260**	39,980	**54,200**	1,088,800	**484,300**	3.10	1.52	**18.84**	0.21	**2.57**
6.500	**165.10**	2.500	**63.50**	96.12	**143.04**	23,020	**31,220**	36,050	**48,880**	986,200	**438,700**	3.23	1.47	**18.24**	0.25	**3.17**
6.500	**165.10**	2.813	**71.44**	91.69	**136.45**	19,920	**27,000**	30,610	**41,500**	842,800	**374,900**	3.48	1.40	**17.40**	0.32	**4.01**
6.500	**165.10**	3.000	**76.20**	88.78	**132.12**	17,890	**24,260**	27,070	**36,710**	748,700	**333,000**	3.70	1.36	**16.85**	0.37	**4.56**
5 1/2 API FH																
7.000	**177.80**	2.250	**57.15**	117.31	**174.58**	32,760 *	**44,410**	52,410	**71,070**	1,767,100	**786,000**	1.62	1.79	**22.26**	0.21	**2.57**
7.000	**177.80**	2.500	**63.50**	114.14	**169.86**	32,760 *	**44,410**	52,410	**71,070**	1,673,800	**744,500**	1.65	1.74	**21.66**	0.25	**3.17**
7.000	**177.80**	2.813	**71.44**	109.71	**163.27**	32,760 *	**44,410**	52,410	**71,070**	1,543,400	**686,500**	1.70	1.68	**20.82**	0.32	**4.01**
7.000	**177.80**	3.000	**76.20**	106.80	**158.94**	32,760 *	**44,410**	52,410	**71,070**	1,457,800	**648,500**	1.74	1.63	**20.27**	0.37	**4.56**
7.000	**177.80**	3.250	**82.55**	102.63	**152.73**	32,760 *	**44,410**	52,410	**71,070**	1,335,100	**593,900**	1.81	1.57	**19.48**	0.43	**5.35**
7.000	**177.80**	4.000	**101.60**	88.11	**131.12**	29,000	**39,320**	40,630	**55,090**	908,100	**403,900**	2.25	1.35	**16.72**	0.65	**8.11**
7.250	**184.15**	2.250	**57.15**	126.83	**188.74**	40,990 *	**55,580**	65,590	**88,930**	1,767,100	**786,000**	1.89	1.94	**24.07**	0.21	**2.57**
7.250	**184.15**	2.500	**63.50**	123.65	**184.02**	40,990 *	**55,580**	65,590	**88,930**	1,673,800	**744,500**	1.93	1.89	**23.47**	0.25	**3.17**
7.250	**184.15**	2.813	**71.44**	119.22	**177.42**	40,990 *	**55,580**	65,590	**88,930**	1,543,400	**686,500**	1.98	1.82	**22.63**	0.32	**4.01**
7.250	**184.15**	3.000	**76.20**	116.31	**173.09**	40,990 *	**55,580**	65,590	**88,930**	1,457,800	**648,500**	2.03	1.78	**22.07**	0.37	**4.56**
7.250	**184.15**	3.250	**82.55**	112.14	**166.88**	40,990 *	**55,580**	60,560	**82,110**	1,335,100	**593,900**	2.11	1.71	**21.28**	0.43	**5.35**
7.500	**190.50**	2.250	**57.15**	136.67	**203.39**	49,660 *	**67,330**	79,450	**107,720**	1,767,100	**786,000**	2.18	2.09	**25.94**	0.21	**2.57**
7.500	**190.50**	2.500	**63.50**	133.50	**198.67**	49,660 *	**67,330**	76,620	**103,880**	1,673,800	**744,500**	2.22	2.04	**25.34**	0.25	**3.17**
7.500	**190.50**	2.813	**71.44**	129.07	**192.07**	47,750	**64,740**	70,510	**95,600**	1,543,400	**686,500**	2.28	1.97	**24.49**	0.32	**4.01**
7.500	**190.50**	3.000	**76.20**	126.16	**187.74**	45,190	**61,260**	66,420	**90,060**	1,457,800	**648,500**	2.34	1.93	**23.94**	0.37	**4.56**
7.500	**190.50**	3.250	**82.55**	121.99	**181.53**	41,530	**56,310**	60,590	**82,150**	1,335,100	**593,900**	2.43	1.86	**23.15**	0.43	**5.35**
7.750	**196.85**	2.250	**57.15**	146.85	**218.54**	54,510	**73,910**	81,290	**110,210**	1,767,100	**786,000**	2.48	2.24	**27.87**	0.21	**2.57**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
5 1/2 API FH																
7.750	**196.85**	2.500	**63.50**	143.68	**213.82**	51,680	**70,070**	76,780	**104,100**	1,673,800	**744,500**	2.52	2.20	**27.27**	0.25	**3.17**
7.750	**196.85**	2.813	**71.44**	139.25	**207.22**	47,750	**64,740**	70,510	**95,600**	1,543,400	**686,500**	2.60	2.13	**26.43**	0.32	**4.01**
7.750	**196.85**	3.000	**76.20**	136.34	**202.89**	45,190	**61,260**	66,420	**90,060**	1,457,800	**648,500**	2.66	2.08	**25.87**	0.37	**4.56**
7.750	**196.85**	3.250	**82.55**	132.17	**196.68**	41,530	**56,310**	60,590	**82,150**	1,335,100	**593,900**	2.77	2.02	**25.08**	0.43	**5.35**
6 5/8 API FH																
8.000	**203.20**	5.000	**127.00**	104.13	**154.96**	38,130	**51,700**	52,890	**71,710**	1,028,200	**457,300**	2.26	1.59	**19.76**	1.02	**12.67**
8.500	**215.90**	2.500	**63.50**	176.22	**262.24**	67,780 *	**91,900**	108,460	**147,050**	2,500,800	**1,112,400**	1.86	2.69	**33.44**	0.25	**3.17**
8.500	**215.90**	2.813	**71.44**	171.79	**255.65**	67,780 *	**91,900**	108,460	**147,050**	2,370,400	**1,054,400**	1.89	2.63	**32.60**	0.32	**4.01**
8.500	**215.90**	3.000	**76.20**	168.88	**251.32**	67,780 *	**91,900**	108,460	**147,050**	2,284,800	**1,016,300**	1.91	2.58	**32.05**	0.37	**4.56**
8.500	**215.90**	3.250	**82.55**	164.71	**245.11**	67,780 *	**91,900**	108,460	**147,050**	2,162,100	**961,700**	1.95	2.52	**31.26**	0.43	**5.35**
8.500	**215.90**	3.500	**88.90**	160.20	**238.40**	67,780 *	**91,900**	106,710	**144,680**	2,029,600	**902,800**	2.01	2.45	**30.40**	0.50	**6.21**
8.500	**215.90**	3.750	**95.25**	155.36	**231.20**	67,180	**91,080**	99,190	**134,480**	1,887,200	**839,500**	2.07	2.37	**29.48**	0.57	**7.13**
8.750	**222.25**	2.500	**63.50**	187.73	**279.38**	79,540 *	**107,840**	127,270	**172,550**	2,500,800	**1,112,400**	2.11	2.87	**35.63**	0.25	**3.17**
8.750	**222.25**	2.813	**71.44**	183.30	**272.78**	79,540 *	**107,840**	125,620	**170,320**	2,370,400	**1,054,400**	2.14	2.80	**34.79**	0.32	**4.01**
8.750	**222.25**	3.000	**76.20**	180.39	**268.45**	79,540 *	**107,840**	121,080	**164,170**	2,284,800	**1,016,300**	2.16	2.76	**34.23**	0.37	**4.56**
8.750	**222.25**	3.250	**82.55**	176.22	**262.24**	76,700	**103,990**	114,370	**155,060**	2,162,100	**961,700**	2.21	2.69	**33.44**	0.43	**5.35**
8.750	**222.25**	3.500	**88.90**	171.71	**255.54**	72,100	**97,750**	107,030	**145,110**	2,029,600	**902,800**	2.27	2.62	**32.59**	0.50	**6.21**
8.750	**222.25**	3.750	**95.25**	166.88	**248.34**	67,180	**91,080**	99,190	**134,480**	1,887,200	**839,500**	2.34	2.55	**31.67**	0.57	**7.13**
9.000	**228.60**	2.500	**63.50**	199.58	**297.01**	88,580	**120,100**	133,300	**180,740**	2,500,800	**1,112,400**	2.36	3.05	**37.88**	0.25	**3.17**
9.000	**228.60**	2.813	**71.44**	195.15	**290.42**	83,990	**113,870**	125,980	**170,810**	2,370,400	**1,054,400**	2.40	2.98	**37.04**	0.32	**4.01**
9.000	**228.60**	3.000	**76.20**	192.24	**286.08**	80,990	**109,800**	121,200	**164,330**	2,284,800	**1,016,300**	2.43	2.94	**36.48**	0.37	**4.56**
9.000	**228.60**	3.250	**82.55**	188.07	**279.88**	76,700	**103,990**	114,370	**155,060**	2,162,100	**961,700**	2.48	2.87	**35.69**	0.43	**5.35**
9.000	**228.60**	3.500	**88.90**	183.56	**273.17**	72,100	**97,750**	107,030	**145,110**	2,029,600	**902,800**	2.54	2.80	**34.84**	0.50	**6.21**
9.000	**228.60**	3.750	**95.25**	178.72	**265.97**	67,180	**91,080**	99,190	**134,480**	1,887,200	**839,500**	2.63	2.73	**33.92**	0.57	**7.13**
9.250	**234.95**	2.500	**63.50**	211.76	**315.14**	88,580	**120,100**	133,300	**180,740**	2,500,800	**1,112,400**	2.63	3.24	**40.19**	0.25	**3.17**
9.250	**234.95**	2.813	**71.44**	207.33	**308.54**	83,990	**113,870**	125,980	**170,810**	2,370,400	**1,054,400**	2.67	3.17	**39.35**	0.32	**4.01**
9.250	**234.95**	3.000	**76.20**	204.42	**304.21**	80,990	**109,800**	121,200	**164,330**	2,284,800	**1,016,300**	2.70	3.12	**38.79**	0.37	**4.56**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
6 5/8 API FH																
9.250	**234.95**	3.250	**82.55**	200.25	**298.00**	76,700	**103,990**	114,370	**155,060**	2,162,100	**961,700**	2.76	3.06	**38.00**	0.43	**5.35**
9.250	**234.95**	3.500	**88.90**	195.74	**291.30**	72,100	**97,750**	107,030	**145,110**	2,029,600	**902,800**	2.83	2.99	**37.15**	0.50	**6.21**
9.250	**234.95**	3.750	**95.25**	190.91	**284.10**	67,180	**91,080**	99,190	**134,480**	1,887,200	**839,500**	2.93	2.92	**36.23**	0.57	**7.13**
9.500	**241.30**	2.500	**63.50**	224.28	**333.77**	88,580	**120,100**	133,300	**180,740**	2,500,800	**1,112,400**	2.91	3.43	**42.56**	0.25	**3.17**
9.500	**241.30**	2.813	**71.44**	219.85	**327.17**	83,990	**113,870**	125,980	**170,810**	2,370,400	**1,054,400**	2.95	3.36	**41.72**	0.32	**4.01**
9.500	**241.30**	3.000	**76.20**	216.94	**322.84**	80,990	**109,800**	121,200	**164,330**	2,284,800	**1,016,300**	2.99	3.31	**41.17**	0.37	**4.56**
9.500	**241.30**	3.250	**82.55**	212.77	**316.63**	76,700	**103,990**	114,370	**155,060**	2,162,100	**961,700**	3.05	3.25	**40.38**	0.43	**5.35**
9.500	**241.30**	3.500	**88.90**	208.26	**309.93**	72,100	**97,750**	107,030	**145,110**	2,029,600	**902,800**	3.13	3.18	**39.52**	0.50	**6.21**
9.500	**241.30**	3.750	**95.25**	203.42	**302.72**	67,180	**91,080**	99,190	**134,480**	1,887,200	**839,500**	3.24	3.11	**38.60**	0.57	**7.13**
2 3/8 SL-H90																
3.500	**88.90**	1.000	**25.40**	30.04	**44.70**	6,250 *	**8,480**	10,010	**13,570**	399,600	**177,700**	2.19	0.46	**5.70**	0.04	**0.51**
3.500	**88.90**	1.250	**31.75**	28.54	**42.47**	5,860	**7,950**	9,380	**12,720**	355,400	**158,100**	2.28	0.44	**5.42**	0.06	**0.79**
3.500	**88.90**	1.500	**38.10**	26.70	**39.73**	4,940	**6,700**	7,900	**10,720**	301,400	**134,000**	2.47	0.41	**5.07**	0.09	**1.14**
3.500	**88.90**	1.750	**44.45**	24.53	**36.51**	3,860	**5,240**	6,180	**8,380**	237,600	**105,600**	2.85	0.37	**4.66**	0.12	**1.55**
3.750	**95.25**	1.000	**25.40**	34.88	**51.90**	6,620	**8,980**	10,600	**14,380**	399,600	**177,700**	2.92	0.53	**6.62**	0.04	**0.51**
3.750	**95.25**	1.250	**31.75**	33.38	**49.67**	5,860	**7,950**	9,380	**12,720**	355,400	**158,100**	3.04	0.51	**6.33**	0.06	**0.79**
3.750	**95.25**	1.500	**38.10**	31.54	**46.94**	4,940	**6,700**	7,900	**10,720**	301,400	**134,000**	3.29	0.48	**5.99**	0.09	**1.14**
2 7/8 SL-H90																
4.000	**101.60**	1.500	**38.10**	36.71	**54.63**	8,600 *	**11,660**	13,770	**18,670**	501,300	**223,000**	1.92	0.56	**6.97**	0.09	**1.14**
4.000	**101.60**	1.750	**44.45**	34.54	**51.41**	8,260	**11,210**	13,230	**17,930**	437,500	**194,600**	2.04	0.53	**6.56**	0.12	**1.55**
4.000	**101.60**	2.000	**50.80**	32.04	**47.68**	6,830	**9,260**	10,930	**14,820**	363,900	**161,800**	2.27	0.49	**6.08**	0.16	**2.03**
4.000	**101.60**	2.250	**57.15**	29.20	**43.46**	5,220	**7,080**	8,360	**11,330**	280,500	**124,700**	2.72	0.45	**5.54**	0.21	**2.57**
4.250	**107.95**	1.500	**38.10**	42.22	**62.83**	9,520	**12,910**	15,240	**20,670**	501,300	**223,000**	2.50	0.65	**8.01**	0.09	**1.14**
4.250	**107.95**	1.750	**44.45**	40.05	**59.60**	8,260	**11,210**	13,230	**17,930**	437,500	**194,600**	2.67	0.61	**7.60**	0.12	**1.55**
4.250	**107.95**	2.000	**50.80**	37.55	**55.88**	6,830	**9,260**	10,930	**14,820**	363,900	**161,800**	2.97	0.57	**7.13**	0.16	**2.03**
4.500	**114.30**	1.500	**38.10**	48.06	**71.52**	9,520	**12,910**	15,240	**20,670**	501,300	**223,000**	3.15	0.73	**9.12**	0.09	**1.14**
4.500	**114.30**	1.750	**44.45**	45.89	**68.29**	8,260	**11,210**	13,230	**17,930**	437,500	**194,600**	3.36	0.70	**8.71**	0.12	**1.55**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
3 1/2 SL-H90																
4.750	**120.65**	1.500	**38.10**	54.23	**80.71**	13,690 *	**18,560**	21,910	**29,710**	780,300	**347,100**	1.66	0.83	**10.29**	0.09	**1.14**
4.750	**120.65**	1.750	**44.45**	52.07	**77.48**	13,690 *	**18,560**	21,910	**29,710**	764,500	**340,100**	1.71	0.80	**9.88**	0.12	**1.55**
4.750	**120.65**	2.000	**50.80**	49.56	**73.76**	13,690 *	**18,560**	21,910	**29,710**	690,900	**307,300**	1.78	0.76	**9.41**	0.16	**2.03**
4.750	**120.65**	2.250	**57.15**	46.73	**69.53**	13,490	**18,290**	21,580	**29,260**	607,500	**270,200**	1.91	0.71	**8.87**	0.21	**2.57**
4.750	**120.65**	2.500	**63.50**	43.55	**64.82**	11,350	**15,390**	18,160	**24,620**	514,200	**228,700**	2.11	0.67	**8.27**	0.25	**3.17**
4.750	**120.65**	2.750	**69.85**	40.05	**59.60**	9,010	**12,220**	14,420	**19,550**	411,100	**182,800**	2.47	0.61	**7.60**	0.31	**3.83**
5.000	**127.00**	1.500	**38.10**	60.74	**90.39**	18,160 *	**24,620**	29,050	**39,390**	828,400	**368,400**	2.10	0.93	**11.53**	0.09	**1.14**
5.000	**127.00**	1.750	**44.45**	58.57	**87.17**	17,140	**23,240**	27,430	**37,190**	764,500	**340,100**	2.16	0.90	**11.12**	0.12	**1.55**
5.000	**127.00**	2.000	**50.80**	56.07	**83.44**	15,420	**20,910**	24,670	**33,460**	690,900	**307,300**	2.25	0.86	**10.64**	0.16	**2.03**
5.000	**127.00**	2.250	**57.15**	53.23	**79.22**	13,490	**18,290**	21,580	**29,260**	607,500	**270,200**	2.41	0.81	**10.10**	0.21	**2.57**
5.000	**127.00**	2.500	**63.50**	50.06	**74.50**	11,350	**15,390**	18,160	**24,620**	514,200	**228,700**	2.67	0.76	**9.50**	0.25	**3.17**
5.000	**127.00**	2.750	**69.85**	46.56	**69.29**	9,010	**12,220**	14,420	**19,550**	411,100	**182,800**	3.13	0.71	**8.84**	0.31	**3.83**
5.250	**133.35**	1.500	**38.10**	67.58	**100.58**	18,640	**25,270**	29,830	**40,440**	828,400	**368,400**	2.58	1.03	**12.83**	0.09	**1.14**
5.250	**133.35**	1.750	**44.45**	65.42	**97.35**	17,140	**23,240**	27,430	**37,190**	764,500	**340,100**	2.65	1.00	**12.41**	0.12	**1.55**
5.250	**133.35**	2.000	**50.80**	62.91	**93.62**	15,420	**20,910**	24,670	**33,460**	690,900	**307,300**	2.77	0.96	**11.94**	0.16	**2.03**
5.250	**133.35**	2.250	**57.15**	60.08	**89.40**	13,490	**18,290**	21,580	**29,260**	607,500	**270,200**	2.96	0.92	**11.40**	0.21	**2.57**
5.500	**139.70**	1.500	**38.10**	74.76	**111.26**	18,640	**25,270**	29,830	**40,440**	828,400	**368,400**	3.10	1.14	**14.19**	0.09	**1.14**
5.500	**139.70**	1.750	**44.45**	72.59	**108.03**	17,140	**23,240**	27,430	**37,190**	764,500	**340,100**	3.18	1.11	**13.78**	0.12	**1.55**
3 1/2 H-90																
4.750	**120.65**	1.750	**44.45**	52.07	**77.48**	8,780 *	**11,910**	17,190	**23,310**	877,100	**390,100**	1.42	0.80	**9.88**	0.12	**1.55**
4.750	**120.65**	2.000	**50.80**	49.56	**73.76**	8,780 *	**11,910**	17,190	**23,310**	809,300	**360,000**	1.47	0.76	**9.41**	0.16	**2.03**
4.750	**120.65**	2.250	**57.15**	46.73	**69.53**	8,780 *	**11,910**	17,190	**23,310**	717,500	**319,100**	1.55	0.71	**8.87**	0.21	**2.57**
4.750	**120.65**	2.500	**63.50**	43.55	**64.82**	8,780 *	**11,910**	17,190	**23,310**	614,900	**273,500**	1.67	0.67	**8.27**	0.25	**3.17**
4.750	**120.65**	2.813	**71.44**	39.12	**58.22**	8,780 *	**11,910**	16,920	**22,940**	471,500	**209,700**	1.94	0.60	**7.42**	0.32	**4.01**
5.000	**127.00**	1.750	**44.45**	58.57	**87.17**	12,790 *	**17,340**	25,040	**33,950**	890,300	**396,000**	1.80	0.90	**11.12**	0.12	**1.55**
5.000	**127.00**	2.000	**50.80**	56.07	**83.44**	12,790 *	**17,340**	25,040	**33,950**	809,300	**360,000**	1.86	0.86	**10.64**	0.16	**2.03**
5.000	**127.00**	2.250	**57.15**	53.23	**79.22**	12,790 *	**17,340**	25,040	**33,950**	717,500	**319,100**	1.95	0.81	**10.10**	0.21	**2.57**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
3 1/2 H-90																
5.000	**127.00**	2.500	**63.50**	50.06	**74.50**	12,790 *	**17,340**	22,320	**30,260**	614,900	**273,500**	2.11	0.76	**9.50**	0.25	**3.17**
5.000	**127.00**	2.813	**71.44**	45.63	**67.90**	10,400	**14,110**	17,000	**23,050**	471,500	**209,700**	2.45	0.70	**8.66**	0.32	**4.01**
5.250	**133.35**	1.750	**44.45**	65.42	**97.35**	17,090 *	**23,170**	32,690	**44,320**	890,300	**396,000**	2.20	1.00	**12.41**	0.12	**1.55**
5.250	**133.35**	2.000	**50.80**	62.91	**93.62**	16,920	**22,950**	29,700	**40,270**	809,300	**360,000**	2.27	0.96	**11.94**	0.16	**2.03**
5.250	**133.35**	2.250	**57.15**	60.08	**89.40**	15,130	**20,520**	26,210	**35,540**	717,500	**319,100**	2.39	0.92	**11.40**	0.21	**2.57**
5.250	**133.35**	2.500	**63.50**	56.90	**84.68**	13,150	**17,830**	22,340	**30,290**	614,900	**273,500**	2.58	0.87	**10.80**	0.25	**3.17**
5.250	**133.35**	2.813	**71.44**	52.47	**78.09**	10,400	**14,110**	17,000	**23,050**	471,500	**209,700**	3.00	0.80	**9.96**	0.32	**4.01**
5.500	**139.70**	1.750	**44.45**	72.59	**108.03**	18,520	**25,110**	32,800	**44,480**	890,300	**396,000**	2.64	1.11	**13.78**	0.12	**1.55**
5.500	**139.70**	2.000	**50.80**	70.09	**104.30**	16,920	**22,950**	29,700	**40,270**	809,300	**360,000**	2.73	1.07	**13.30**	0.16	**2.03**
5.500	**139.70**	2.250	**57.15**	67.25	**100.08**	15,130	**20,520**	26,210	**35,540**	717,500	**319,100**	2.87	1.03	**12.76**	0.21	**2.57**
5.500	**139.70**	2.500	**63.50**	64.08	**95.36**	13,150	**17,830**	22,340	**30,290**	614,900	**273,500**	3.10	0.98	**12.16**	0.25	**3.17**
5.500	**139.70**	2.813	**71.44**	59.65	**88.77**	10,400	**14,110**	17,000	**23,050**	471,500	**209,700**	3.60	0.91	**11.32**	0.32	**4.01**
4 H-90																
5.250	**133.35**	1.750	**44.45**	65.42	**97.35**	12,590 *	**17,070**	24,640	**33,410**	1,097,400	**488,100**	1.46	1.00	**12.41**	0.12	**1.55**
5.250	**133.35**	2.000	**50.80**	62.91	**93.62**	12,590 *	**17,070**	24,640	**33,410**	1,058,400	**470,800**	1.49	0.96	**11.94**	0.16	**2.03**
5.250	**133.35**	2.250	**57.15**	60.08	**89.40**	12,590 *	**17,070**	24,640	**33,410**	966,600	**429,900**	1.54	0.92	**11.40**	0.21	**2.57**
5.250	**133.35**	2.500	**63.50**	56.90	**84.68**	12,590 *	**17,070**	24,640	**33,410**	864,000	**384,300**	1.62	0.87	**10.80**	0.25	**3.17**
5.250	**133.35**	2.813	**71.44**	52.47	**78.09**	12,590 *	**17,070**	24,640	**33,410**	720,500	**320,500**	1.78	0.80	**9.96**	0.32	**4.01**
5.500	**139.70**	1.750	**44.45**	72.59	**108.03**	17,400 *	**23,590**	34,050	**46,170**	1,139,400	**506,800**	1.79	1.11	**13.78**	0.12	**1.55**
5.500	**139.70**	2.000	**50.80**	70.09	**104.30**	17,400 *	**23,590**	34,050	**46,170**	1,058,400	**470,800**	1.83	1.07	**13.30**	0.16	**2.03**
5.500	**139.70**	2.250	**57.15**	67.25	**100.08**	17,400 *	**23,590**	34,050	**46,170**	966,600	**429,900**	1.89	1.03	**12.76**	0.21	**2.57**
5.500	**139.70**	2.500	**63.50**	64.08	**95.36**	17,400 *	**23,590**	34,050	**46,170**	864,000	**384,300**	1.99	0.98	**12.16**	0.25	**3.17**
5.500	**139.70**	2.813	**71.44**	59.65	**88.77**	16,530	**22,410**	28,350	**38,440**	720,500	**320,500**	2.18	0.91	**11.32**	0.32	**4.01**
5.750	**146.05**	1.750	**44.45**	80.10	**119.20**	22,530 *	**30,540**	44,090	**59,790**	1,139,400	**506,800**	2.15	1.22	**15.20**	0.12	**1.55**
5.750	**146.05**	2.000	**50.80**	77.60	**115.48**	22,530 *	**30,540**	42,160	**57,170**	1,058,400	**470,800**	2.20	1.19	**14.73**	0.16	**2.03**
5.750	**146.05**	2.250	**57.15**	74.76	**111.26**	21,710	**29,440**	38,440	**52,120**	966,600	**429,900**	2.28	1.14	**14.19**	0.21	**2.57**
5.750	**146.05**	2.500	**63.50**	71.59	**106.54**	19,540	**26,490**	34,210	**46,390**	864,000	**384,300**	2.39	1.09	**13.59**	0.25	**3.17**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
4 H-90																
5.750	**146.05**	2.813	**71.44**	67.16	**99.94**	16,530	**22,410**	28,350	**38,440**	720,500	**320,500**	2.63	1.03	**12.74**	0.32	**4.01**
6.000	**152.40**	1.750	**44.45**	87.94	**130.87**	25,400	**34,440**	45,640	**61,890**	1,139,400	**506,800**	2.54	1.34	**16.69**	0.12	**1.55**
6.000	**152.40**	2.000	**50.80**	85.44	**127.15**	23,670	**32,090**	42,260	**57,290**	1,058,400	**470,800**	2.60	1.31	**16.21**	0.16	**2.03**
6.000	**152.40**	2.250	**57.15**	82.60	**122.93**	21,710	**29,440**	38,440	**52,120**	966,600	**429,900**	2.69	1.26	**15.68**	0.21	**2.57**
6.000	**152.40**	2.500	**63.50**	79.43	**118.21**	19,540	**26,490**	34,210	**46,390**	864,000	**384,300**	2.83	1.21	**15.07**	0.25	**3.17**
6.000	**152.40**	2.813	**71.44**	75.00	**111.61**	16,530	**22,410**	28,350	**38,440**	720,500	**320,500**	3.10	1.15	**14.23**	0.32	**4.01**
6.250	**158.75**	1.750	**44.45**	96.12	**143.04**	25,400	**34,440**	45,640	**61,890**	1,139,400	**506,800**	2.96	1.47	**18.24**	0.12	**1.55**
6.250	**158.75**	2.000	**50.80**	93.62	**139.32**	23,670	**32,090**	42,260	**57,290**	1,058,400	**470,800**	3.03	1.43	**17.77**	0.16	**2.03**
6.250	**158.75**	2.250	**57.15**	90.78	**135.10**	21,710	**29,440**	38,440	**52,120**	966,600	**429,900**	3.13	1.39	**17.23**	0.21	**2.57**
6.250	**158.75**	2.500	**63.50**	87.61	**130.38**	19,540	**26,490**	34,210	**46,390**	864,000	**384,300**	3.29	1.34	**16.63**	0.25	**3.17**
6.250	**158.75**	2.813	**71.44**	83.18	**123.78**	16,530	**22,410**	28,350	**38,440**	720,500	**320,500**	3.61	1.27	**15.79**	0.32	**4.01**
4 1/2 H-90																
5.750	**146.05**	2.250	**57.15**	74.76	**111.26**	18,010 *	**24,430**	35,260	**47,810**	1,204,400	**535,700**	1.61	1.14	**14.19**	0.21	**2.57**
5.750	**146.05**	2.500	**63.50**	71.59	**106.54**	18,010 *	**24,430**	35,260	**47,810**	1,101,800	**490,100**	1.67	1.09	**13.59**	0.25	**3.17**
5.750	**146.05**	2.813	**71.44**	67.16	**99.94**	18,010 *	**24,430**	35,260	**47,810**	958,400	**426,300**	1.78	1.03	**12.74**	0.32	**4.01**
5.750	**146.05**	3.000	**76.20**	64.25	**95.61**	18,010 *	**24,430**	35,260	**47,810**	864,200	**384,400**	1.88	0.98	**12.19**	0.37	**4.56**
6.000	**152.40**	2.250	**57.15**	82.60	**122.93**	23,680 *	**32,100**	46,350	**62,840**	1,204,400	**535,700**	1.94	1.26	**15.68**	0.21	**2.57**
6.000	**152.40**	2.500	**63.50**	79.43	**118.21**	23,680 *	**32,100**	46,350	**62,840**	1,101,800	**490,100**	2.01	1.21	**15.07**	0.25	**3.17**
6.000	**152.40**	2.813	**71.44**	75.00	**111.61**	23,150	**31,390**	40,480	**54,890**	958,400	**426,300**	2.14	1.15	**14.23**	0.32	**4.01**
6.000	**152.40**	3.000	**76.20**	72.09	**107.28**	21,050	**28,540**	36,370	**49,320**	864,200	**384,400**	2.26	1.10	**13.68**	0.37	**4.56**
6.250	**158.75**	2.250	**57.15**	90.78	**135.10**	28,730	**38,950**	51,340	**69,620**	1,204,400	**535,700**	2.29	1.39	**17.23**	0.21	**2.57**
6.250	**158.75**	2.500	**63.50**	87.61	**130.38**	26,390	**35,780**	46,790	**63,450**	1,101,800	**490,100**	2.37	1.34	**16.63**	0.25	**3.17**
6.250	**158.75**	2.813	**71.44**	83.18	**123.78**	23,150	**31,390**	40,480	**54,890**	958,400	**426,300**	2.53	1.27	**15.79**	0.32	**4.01**
6.250	**158.75**	3.000	**76.20**	80.27	**119.45**	21,050	**28,540**	36,370	**49,320**	864,200	**384,400**	2.67	1.23	**15.23**	0.37	**4.56**
6.500	**165.10**	2.250	**57.15**	99.29	**147.76**	28,730	**38,950**	51,340	**69,620**	1,204,400	**535,700**	2.66	1.52	**18.84**	0.21	**2.57**
6.500	**165.10**	2.500	**63.50**	96.12	**143.04**	26,390	**35,780**	46,790	**63,450**	1,101,800	**490,100**	2.76	1.47	**18.24**	0.25	**3.17**
6.500	**165.10**	2.813	**71.44**	91.69	**136.45**	23,150	**31,390**	40,480	**54,890**	958,400	**426,300**	2.95	1.40	**17.40**	0.32	**4.01**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
4 1/2 H-90																
6.500	**165.10**	3.000	**76.20**	88.78	**132.12**	21,050	**28,540**	36,370	**49,320**	864,200	**384,400**	3.11	1.36	**16.85**	0.37	**4.56**
6.750	**171.45**	2.250	**57.15**	108.14	**160.92**	28,730	**38,950**	51,340	**69,620**	1,204,400	**535,700**	3.07	1.65	**20.52**	0.21	**2.57**
6.750	**171.45**	2.500	**63.50**	104.96	**156.20**	26,390	**35,780**	46,790	**63,450**	1,101,800	**490,100**	3.18	1.60	**19.92**	0.25	**3.17**
6.750	**171.45**	2.813	**71.44**	100.53	**149.61**	23,150	**31,390**	40,480	**54,890**	958,400	**426,300**	3.39	1.54	**19.08**	0.32	**4.01**
6.750	**171.45**	3.000	**76.20**	97.62	**145.28**	21,050 *	**28,540**	36,370	**49,320**	864,200	**384,400**	3.58	1.49	**18.53**	0.37	**4.56**
5 H-90																
6.250	**158.75**	2.250	**57.15**	90.78	**135.10**	25,350 *	**34,380**	49,630	**67,290**	1,410,600	**627,400**	1.79	1.39	**17.23**	0.21	**2.57**
6.250	**158.75**	2.500	**63.50**	87.61	**130.38**	25,350 *	**34,380**	49,630	**67,290**	1,308,000	**581,800**	1.84	1.34	**16.63**	0.25	**3.17**
6.250	**158.75**	2.813	**71.44**	83.18	**123.78**	25,350 *	**34,380**	49,630	**67,290**	1,164,600	**518,000**	1.93	1.27	**15.79**	0.32	**4.01**
6.250	**158.75**	3.000	**76.20**	80.27	**119.45**	25,350 *	**34,380**	47,460	**64,350**	1,070,400	**476,100**	2.01	1.23	**15.23**	0.37	**4.56**
6.250	**158.75**	3.250	**82.55**	76.10	**113.24**	23,980	**32,520**	41,390	**56,120**	935,400	**416,100**	2.16	1.16	**14.44**	0.43	**5.35**
6.500	**165.10**	2.250	**57.15**	99.29	**147.76**	31,890 *	**43,240**	62,420	**84,640**	1,410,600	**627,400**	2.10	1.52	**18.84**	0.21	**2.57**
6.500	**165.10**	2.500	**63.50**	96.12	**143.04**	31,890 *	**43,240**	58,540	**79,370**	1,308,000	**581,800**	2.16	1.47	**18.24**	0.25	**3.17**
6.500	**165.10**	2.813	**71.44**	91.69	**136.45**	29,390	**39,860**	51,940	**70,420**	1,164,600	**518,000**	2.27	1.40	**17.40**	0.32	**4.01**
6.500	**165.10**	3.000	**76.20**	88.78	**132.12**	27,160	**36,830**	47,590	**64,520**	1,070,400	**476,100**	2.37	1.36	**16.85**	0.37	**4.56**
6.500	**165.10**	3.250	**82.55**	84.61	**125.91**	23,980	**32,520**	41,390	**56,120**	935,400	**416,100**	2.54	1.29	**16.06**	0.43	**5.35**
6.750	**171.45**	2.250	**57.15**	108.14	**160.92**	35,290	**47,840**	63,430	**86,000**	1,410,600	**627,400**	2.44	1.65	**20.52**	0.21	**2.57**
6.750	**171.45**	2.500	**63.50**	104.96	**156.20**	32,820	**44,500**	58,620	**79,480**	1,308,000	**581,800**	2.51	1.60	**19.92**	0.25	**3.17**
6.750	**171.45**	2.813	**71.44**	100.53	**149.61**	29,390	**39,860**	51,940	**70,420**	1,164,600	**518,000**	2.64	1.54	**19.08**	0.32	**4.01**
6.750	**171.45**	3.000	**76.20**	97.62	**145.28**	27,160	**36,830**	47,590	**64,520**	1,070,400	**476,100**	2.75	1.49	**18.53**	0.37	**4.56**
6.750	**171.45**	3.250	**82.55**	93.45	**139.07**	23,980	**32,520**	41,390	**56,120**	935,400	**416,100**	2.95	1.43	**17.73**	0.43	**5.35**
7.000	**177.80**	2.250	**57.15**	117.31	**174.58**	35,290	**47,840**	57,660	**78,180**	1,282,400	**570,400**	2.80	1.79	**22.26**	0.21	**2.57**
7.000	**177.80**	2.500	**63.50**	114.14	**169.86**	32,820	**44,500**	53,290	**72,250**	1,189,100	**528,900**	2.88	1.74	**21.66**	0.25	**3.17**
7.000	**177.80**	2.813	**71.44**	109.71	**163.27**	29,390	**39,860**	47,220	**64,020**	1,058,700	**470,900**	3.02	1.68	**20.82**	0.32	**4.01**
7.000	**177.80**	3.000	**76.20**	106.80	**158.94**	27,160	**36,830**	43,260	**58,660**	973,100	**432,800**	3.15	1.63	**20.27**	0.37	**4.56**
7.000	**177.80**	3.250	**82.55**	102.63	**152.73**	23,980	**32,520**	37,630	**51,020**	850,400	**378,200**	3.39	1.57	**19.48**	0.43	**5.35**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
5 1/2 H-90																
6.750	**171.45**	2.250	**57.15**	108.14	**160.92**	34,500 *	**46,780**	67,540	**91,570**	1,642,200	**730,500**	1.93	1.65	**20.52**	0.21	**2.57**
6.750	**171.45**	2.500	**63.50**	104.96	**156.20**	34,500 *	**46,780**	67,540	**91,570**	1,539,600	**684,800**	1.97	1.60	**19.92**	0.25	**3.17**
6.750	**171.45**	2.813	**71.44**	100.53	**149.61**	34,500 *	**46,780**	65,470	**88,770**	1,396,200	**621,000**	2.05	1.54	**19.08**	0.32	**4.01**
6.750	**171.45**	3.000	**76.20**	97.62	**145.28**	34,140	**46,290**	61,030	**82,740**	1,302,000	**579,100**	2.12	1.49	**18.53**	0.37	**4.56**
6.750	**171.45**	3.250	**82.55**	93.45	**139.07**	30,780	**41,730**	54,470	**73,860**	1,167,000	**519,100**	2.24	1.43	**17.73**	0.43	**5.35**
7.000	**177.80**	2.250	**57.15**	117.31	**174.58**	41,990 *	**56,930**	70,630	**95,760**	1,492,900	**664,000**	2.23	1.79	**22.26**	0.21	**2.57**
7.000	**177.80**	2.500	**63.50**	114.14	**169.86**	40,110	**54,390**	66,070	**89,580**	1,399,600	**622,600**	2.28	1.74	**21.66**	0.25	**3.17**
7.000	**177.80**	2.813	**71.44**	109.71	**163.27**	36,500	**49,480**	59,660	**80,890**	1,269,200	**564,600**	2.37	1.68	**20.82**	0.32	**4.01**
7.000	**177.80**	3.000	**76.20**	106.80	**158.94**	34,140	**46,290**	55,480	**75,220**	1,183,600	**526,500**	2.45	1.63	**20.27**	0.37	**4.56**
7.000	**177.80**	3.250	**82.55**	102.63	**152.73**	30,780	**41,730**	49,520	**67,140**	1,060,900	**471,900**	2.59	1.57	**19.48**	0.43	**5.35**
7.250	**184.15**	2.250	**57.15**	126.83	**188.74**	42,710	**57,910**	70,690	**95,840**	1,492,900	**664,000**	2.56	1.94	**24.07**	0.21	**2.57**
7.250	**184.15**	2.500	**63.50**	123.65	**184.02**	40,110	**54,390**	66,070	**89,580**	1,399,600	**622,600**	2.62	1.89	**23.47**	0.25	**3.17**
7.250	**184.15**	2.813	**71.44**	119.22	**177.42**	36,500	**49,480**	59,660	**80,890**	1,269,200	**564,600**	2.72	1.82	**22.63**	0.32	**4.01**
7.250	**184.15**	3.000	**76.20**	116.31	**173.09**	34,140	**46,290**	55,480	**75,220**	1,183,600	**526,500**	2.81	1.78	**22.07**	0.37	**4.56**
7.250	**184.15**	3.250	**82.55**	112.14	**166.88**	30,780	**41,730**	49,520	**67,140**	1,060,900	**471,900**	2.97	1.71	**21.28**	0.43	**5.35**
7.500	**190.50**	2.250	**57.15**	136.67	**203.39**	42,710	**57,910**	70,690	**95,840**	1,492,900	**664,000**	2.91	2.09	**25.94**	0.21	**2.57**
7.500	**190.50**	2.500	**63.50**	133.50	**198.67**	40,110	**54,390**	66,070	**89,580**	1,399,600	**622,600**	2.97	2.04	**25.34**	0.25	**3.17**
7.500	**190.50**	2.813	**71.44**	129.07	**192.07**	36,500	**49,480**	59,660	**80,890**	1,269,200	**564,600**	3.09	1.97	**24.49**	0.32	**4.01**
7.500	**190.50**	3.000	**76.20**	126.16	**187.74**	34,140	**46,290**	55,480	**75,220**	1,183,600	**526,500**	3.19	1.93	**23.94**	0.37	**4.56**
7.500	**190.50**	3.250	**82.55**	121.99	**181.53**	30,780	**41,730**	49,520	**67,140**	1,060,900	**471,900**	3.37	1.86	**23.15**	0.43	**5.35**
6 5/8 H-90																
7.500	**190.50**	2.500	**63.50**	133.50	**198.67**	46,500 *	**63,050**	82,750	**112,200**	1,912,000	**850,500**	1.83	2.04	**25.34**	0.25	**3.17**
7.500	**190.50**	2.813	**71.44**	129.07	**192.07**	46,500 *	**63,050**	82,750	**112,200**	1,781,600	**792,500**	1.88	1.97	**24.49**	0.32	**4.01**
7.500	**190.50**	3.000	**76.20**	126.16	**187.74**	46,500 *	**63,050**	82,750	**112,200**	1,696,000	**754,400**	1.91	1.93	**23.94**	0.37	**4.56**
7.500	**190.50**	3.250	**82.55**	121.99	**181.53**	46,500 *	**63,050**	81,860	**110,990**	1,573,300	**699,800**	1.97	1.86	**23.15**	0.43	**5.35**
7.750	**196.85**	2.500	**63.50**	143.68	**213.82**	55,700 *	**75,520**	99,120	**134,390**	1,912,000	**850,500**	2.10	2.20	**27.27**	0.25	**3.17**
7.750	**196.85**	2.813	**71.44**	139.25	**207.22**	55,700 *	**75,520**	93,440	**126,690**	1,781,600	**792,500**	2.15	2.13	**26.43**	0.32	**4.01**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
6 5/8 H-90																
7.750	**196.85**	3.000	**76.20**	136.34	**202.89**	53,620	**72,710**	88,800	**120,390**	1,696,000	**754,400**	2.19	2.08	**25.87**	0.37	**4.56**
7.750	**196.85**	3.250	**82.55**	132.17	**196.68**	49,850	**67,590**	82,100	**111,320**	1,573,300	**699,800**	2.26	2.02	**25.08**	0.43	**5.35**
8.000	**203.20**	2.500	**63.50**	154.19	**229.46**	60,320	**81,780**	100,670	**136,490**	1,912,000	**850,500**	2.38	2.36	**29.26**	0.25	**3.17**
8.000	**203.20**	2.813	**71.44**	149.76	**222.87**	56,270	**76,290**	93,490	**126,750**	1,781,600	**792,500**	2.44	2.29	**28.42**	0.32	**4.01**
8.000	**203.20**	3.000	**76.20**	146.85	**218.54**	53,620	**72,710**	88,800	**120,390**	1,696,000	**754,400**	2.48	2.24	**27.87**	0.37	**4.56**
8.000	**203.20**	3.250	**82.55**	142.68	**212.33**	49,850	**67,590**	82,100	**111,320**	1,573,300	**699,800**	2.57	2.18	**27.08**	0.43	**5.35**
8.250	**209.55**	2.500	**63.50**	165.04	**245.61**	60,320	**81,780**	100,670	**136,490**	1,912,000	**850,500**	2.68	2.52	**31.32**	0.25	**3.17**
8.250	**209.55**	2.813	**71.44**	160.61	**239.01**	56,270	**76,290**	93,490	**126,750**	1,781,600	**792,500**	2.74	2.45	**30.48**	0.32	**4.01**
8.250	**209.55**	3.000	**76.20**	157.70	**234.68**	53,620	**72,710**	88,800	**120,390**	1,696,000	**754,400**	2.79	2.41	**29.93**	0.37	**4.56**
8.250	**209.55**	3.250	**82.55**	153.53	**228.47**	49,850	**67,590**	82,100	**111,320**	1,573,300	**699,800**	2.89	2.35	**29.14**	0.43	**5.35**
7 H-90																
8.000	**203.20**	2.500	**63.50**	154.19	**229.46**	53,450 *	**72,470**	95,110	**128,950**	2,366,000	**1,052,400**	1.89	2.36	**29.26**	0.25	**3.17**
8.000	**203.20**	2.813	**71.44**	149.76	**222.87**	53,450 *	**72,470**	95,110	**128,950**	2,235,700	**994,400**	1.92	2.29	**28.42**	0.32	**4.01**
8.000	**203.20**	3.000	**76.20**	146.85	**218.54**	53,450 *	**72,470**	95,110	**128,950**	2,150,100	**956,400**	1.95	2.24	**27.87**	0.37	**4.56**
8.000	**203.20**	3.250	**82.55**	142.68	**212.33**	53,450 *	**72,470**	95,110	**128,950**	2,027,300	**901,800**	2.00	2.18	**27.08**	0.43	**5.35**
8.000	**203.20**	3.500	**88.90**	138.17	**205.62**	53,450 *	**72,470**	95,110	**128,950**	1,894,800	**842,800**	2.06	2.11	**26.22**	0.50	**6.21**
8.000	**203.20**	3.750	**95.25**	133.33	**198.42**	53,450 *	**72,470**	95,110	**128,950**	1,752,400	**779,500**	2.14	2.04	**25.30**	0.57	**7.13**
8.250	**209.55**	2.500	**63.50**	165.04	**245.61**	63,730 *	**86,410**	113,410	**153,760**	2,366,000	**1,052,400**	2.12	2.52	**31.32**	0.25	**3.17**
8.250	**209.55**	2.813	**71.44**	160.61	**239.01**	63,730 *	**86,410**	113,410	**153,760**	2,235,700	**994,400**	2.16	2.45	**30.48**	0.32	**4.01**
8.250	**209.55**	3.000	**76.20**	157.70	**234.68**	63,730 *	**86,410**	113,410	**153,760**	2,150,100	**956,400**	2.19	2.41	**29.93**	0.37	**4.56**
8.250	**209.55**	3.250	**82.55**	153.53	**228.47**	63,730 *	**86,410**	111,660	**151,390**	2,027,300	**901,800**	2.24	2.35	**29.14**	0.43	**5.35**
8.250	**209.55**	3.500	**88.90**	149.02	**221.77**	60,970	**82,660**	104,150	**141,210**	1,894,800	**842,800**	2.31	2.28	**28.28**	0.50	**6.21**
8.250	**209.55**	3.750	**95.25**	144.18	**214.56**	56,380	**76,440**	96,000	**130,160**	1,752,400	**779,500**	2.41	2.20	**27.36**	0.57	**7.13**
8.500	**215.90**	2.500	**63.50**	176.22	**262.24**	74,470 *	**100,970**	131,300	**178,020**	2,366,000	**1,052,400**	2.37	2.69	**33.44**	0.25	**3.17**
8.500	**215.90**	2.813	**71.44**	171.79	**255.65**	72,060	**97,700**	123,860	**167,930**	2,235,700	**994,400**	2.42	2.63	**32.60**	0.32	**4.01**
8.500	**215.90**	3.000	**76.20**	168.88	**251.32**	69,260	**93,910**	118,880	**161,190**	2,150,100	**956,400**	2.45	2.58	**32.05**	0.37	**4.56**
8.500	**215.90**	3.250	**82.55**	164.71	**245.11**	65,260	**88,480**	111,780	**151,560**	2,027,300	**901,800**	2.51	2.52	**31.26**	0.43	**5.35**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
7 H-90																
8.500	**215.90**	3.500	**88.90**	160.20	**238.40**	60,970	**82,660**	104,150	**141,210**	1,894,800	**842,800**	2.58	2.45	**30.40**	0.50	**6.21**
8.500	**215.90**	3.750	**95.25**	155.36	**231.20**	56,380	**76,440**	96,000	**130,160**	1,752,400	**779,500**	2.69	2.37	**29.48**	0.57	**7.13**
7 5/8 H-90																
9.000	**228.60**	2.500	**63.50**	199.58	**297.01**	73,010 *	**98,990**	129,920	**176,150**	3,255,100	**1,447,900**	1.75	3.05	**37.88**	0.25	**3.17**
9.000	**228.60**	2.813	**71.44**	195.15	**290.42**	73,010 *	**98,990**	129,920	**176,150**	3,124,700	**1,389,900**	1.76	2.98	**37.04**	0.32	**4.01**
9.000	**228.60**	3.000	**76.20**	192.24	**286.08**	73,010 *	**98,990**	129,920	**176,150**	3,039,100	**1,351,900**	1.78	2.94	**36.48**	0.37	**4.56**
9.000	**228.60**	3.250	**82.55**	188.07	**279.88**	73,010 *	**98,990**	129,920	**176,150**	2,916,400	**1,297,300**	1.80	2.87	**35.69**	0.43	**5.35**
9.000	**228.60**	3.500	**88.90**	183.56	**273.17**	73,010 *	**98,990**	129,920	**176,150**	2,783,900	**1,238,300**	1.83	2.80	**34.84**	0.50	**6.21**
9.000	**228.60**	3.750	**95.25**	178.72	**265.97**	73,010 *	**98,990**	129,920	**176,150**	2,641,500	**1,175,000**	1.87	2.73	**33.92**	0.57	**7.13**
9.250	**234.95**	2.500	**63.50**	211.76	**315.14**	86,000 *	**116,600**	153,030	**207,480**	3,255,100	**1,447,900**	1.94	3.24	**40.19**	0.25	**3.17**
9.250	**234.95**	2.813	**71.44**	207.33	**308.54**	86,000 *	**116,600**	153,030	**207,480**	3,124,700	**1,389,900**	1.96	3.17	**39.35**	0.32	**4.01**
9.250	**234.95**	3.000	**76.20**	204.42	**304.21**	86,000 *	**116,600**	153,030	**207,480**	3,039,100	**1,351,900**	1.98	3.12	**38.79**	0.37	**4.56**
9.250	**234.95**	3.250	**82.55**	200.25	**298.00**	86,000 *	**116,600**	153,030	**207,480**	2,916,400	**1,297,300**	2.00	3.06	**38.00**	0.43	**5.35**
9.250	**234.95**	3.500	**88.90**	195.74	**291.30**	86,000 *	**116,600**	153,030	**207,480**	2,783,900	**1,238,300**	2.04	2.99	**37.15**	0.50	**6.21**
9.250	**234.95**	3.750	**95.25**	190.91	**284.10**	86,000 *	**116,600**	153,030	**207,480**	2,641,500	**1,175,000**	2.08	2.92	**36.23**	0.57	**7.13**
9.500	**241.30**	2.500	**63.50**	224.28	**333.77**	99,500 *	**134,910**	177,060	**240,060**	3,255,100	**1,447,900**	2.15	3.43	**42.56**	0.25	**3.17**
9.500	**241.30**	2.813	**71.44**	219.85	**327.17**	99,500 *	**134,910**	177,060	**240,060**	3,124,700	**1,389,900**	2.17	3.36	**41.72**	0.32	**4.01**
9.500	**241.30**	3.000	**76.20**	216.94	**322.84**	99,500 *	**134,910**	177,060	**240,060**	3,039,100	**1,351,900**	2.19	3.31	**41.17**	0.37	**4.56**
9.500	**241.30**	3.250	**82.55**	212.77	**316.63**	99,500 *	**134,910**	177,060	**240,060**	2,916,400	**1,297,300**	2.22	3.25	**40.38**	0.43	**5.35**
9.500	**241.30**	3.500	**88.90**	208.26	**309.93**	99,500 *	**134,910**	173,900	**235,780**	2,783,900	**1,238,300**	2.25	3.18	**39.52**	0.50	**6.21**
9.500	**241.30**	3.750	**95.25**	203.42	**302.72**	96,280	**130,540**	164,750	**223,370**	2,641,500	**1,175,000**	2.30	3.11	**38.60**	0.57	**7.13**
8 5/8 H-90																
10.250	**260.35**	2.500	**63.50**	263.83	**392.62**	113,480 *	**153,860**	201,920	**273,770**	4,264,500	**1,896,900**	1.82	4.03	**50.07**	0.25	**3.17**
10.250	**260.35**	2.813	**71.44**	259.40	**386.02**	113,480 *	**153,860**	201,920	**273,770**	4,134,100	**1,838,900**	1.83	3.96	**49.23**	0.32	**4.01**
10.250	**260.35**	3.000	**76.20**	256.49	**381.69**	113,480 *	**153,860**	201,920	**273,770**	4,048,500	**1,800,800**	1.84	3.92	**48.68**	0.37	**4.56**
10.250	**260.35**	3.250	**82.55**	252.32	**375.49**	113,480 *	**153,860**	201,920	**273,770**	3,925,800	**1,746,300**	1.86	3.86	**47.88**	0.43	**5.35**
10.250	**260.35**	3.500	**88.90**	247.81	**368.78**	113,480 *	**153,860**	201,920	**273,770**	3,793,300	**1,687,300**	1.87	3.79	**47.03**	0.50	**6.21**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
8 5/8 H-90																
10.250	**260.35**	3.750	**95.25**	242.97	**361.58**	113,480 *	**153,860**	201,920	**273,770**	3,650,900	**1,624,000**	1.90	3.71	**46.11**	0.57	**7.13**
10.500	**266.70**	2.500	**63.50**	277.68	**413.23**	130,060 *	**176,340**	231,420	**313,770**	4,264,500	**1,896,900**	2.00	4.24	**52.70**	0.25	**3.17**
10.500	**266.70**	2.813	**71.44**	273.25	**406.64**	130,060 *	**176,340**	231,420	**313,770**	4,134,100	**1,838,900**	2.01	4.18	**51.86**	0.32	**4.01**
10.500	**266.70**	3.000	**76.20**	270.34	**402.31**	130,060 *	**176,340**	231,420	**313,770**	4,048,500	**1,800,800**	2.02	4.13	**51.30**	0.37	**4.56**
10.500	**266.70**	3.250	**82.55**	266.17	**396.10**	130,060 *	**176,340**	231,420	**313,770**	3,925,800	**1,746,300**	2.04	4.07	**50.51**	0.43	**5.35**
10.500	**266.70**	3.500	**88.90**	261.66	**389.39**	130,060 *	**176,340**	231,420	**313,770**	3,793,300	**1,687,300**	2.06	4.00	**49.66**	0.50	**6.21**
10.500	**266.70**	3.750	**95.25**	256.82	**382.19**	130,060 *	**176,340**	231,420	**313,770**	3,650,900	**1,624,000**	2.08	3.92	**48.74**	0.57	**7.13**
7 H-90 Low Torque Face																
8.750	**222.25**	2.813	**71.44**	183.30	**272.78**	68,060 *	**92,270**	121,100	**164,190**	2,235,700	**994,400**	2.68	2.80	**34.79**	0.32	**4.01**
8.750	**222.25**	3.000	**76.20**	180.39	**268.45**	68,060 *	**92,270**	121,100	**164,190**	2,150,100	**956,400**	2.72	2.76	**34.23**	0.37	**4.56**
8.750	**222.25**	3.250	**82.55**	176.22	**262.24**	67,250	**91,180**	115,190	**156,180**	2,027,300	**901,800**	2.78	2.69	**33.44**	0.43	**5.35**
8.750	**222.25**	3.500	**88.90**	171.71	**255.54**	62,840	**85,200**	107,350	**145,550**	1,894,800	**842,800**	2.87	2.62	**32.59**	0.50	**6.21**
8.750	**222.25**	3.750	**95.25**	166.88	**248.34**	58,130	**78,810**	98,980	**134,200**	1,752,400	**779,500**	2.98	2.55	**31.67**	0.57	**7.13**
9.000	**228.60**	2.813	**71.44**	195.15	**290.42**	74,230	**100,640**	127,590	**172,990**	2,235,700	**994,400**	2.96	2.98	**37.04**	0.32	**4.01**
9.000	**228.60**	3.000	**76.20**	192.24	**286.08**	71,360	**96,750**	122,480	**166,060**	2,150,100	**956,400**	3.01	2.94	**36.48**	0.37	**4.56**
9.000	**228.60**	3.250	**82.55**	188.07	**279.88**	67,250	**91,180**	115,190	**156,180**	2,027,300	**901,800**	3.08	2.87	**35.69**	0.43	**5.35**
9.000	**228.60**	3.500	**88.90**	183.56	**273.17**	62,840	**85,200**	107,350	**145,550**	1,894,800	**842,800**	3.17	2.80	**34.84**	0.50	**6.21**
9.000	**228.60**	3.750	**95.25**	178.72	**265.97**	58,130	**78,810**	98,980	**134,200**	1,752,400	**779,500**	3.30	2.73	**33.92**	0.57	**7.13**
7 5/8 H-90 Low Torque Face																
9.750	**247.65**	2.813	**71.44**	232.70	**346.29**	91,660 *	**124,280**	179,420	**243,260**	3,437,200	**1,528,900**	2.39	3.56	**44.16**	0.32	**4.01**
9.750	**247.65**	3.000	**76.20**	229.79	**341.96**	91,660 *	**124,280**	179,420	**243,260**	3,343,100	**1,487,000**	2.41	3.51	**43.61**	0.37	**4.56**
9.750	**247.65**	3.250	**82.55**	225.62	**335.75**	91,660 *	**124,280**	179,420	**243,260**	3,208,100	**1,427,000**	2.44	3.45	**42.82**	0.43	**5.35**
9.750	**247.65**	3.500	**88.90**	221.11	**329.05**	91,660 *	**124,280**	179,420	**243,260**	3,062,300	**1,362,100**	2.48	3.38	**41.96**	0.50	**6.21**
9.750	**247.65**	3.750	**95.25**	216.27	**321.85**	91,660 *	**124,280**	179,420	**243,260**	2,905,700	**1,292,500**	2.53	3.30	**41.04**	0.57	**7.13**
10.000	**254.00**	2.813	**71.44**	245.88	**365.91**	106,260	**144,060**	207,980	**281,980**	3,437,200	**1,528,900**	2.62	3.76	**46.66**	0.32	**4.01**
10.000	**254.00**	3.000	**76.20**	242.97	**361.58**	106,260	**144,060**	207,980	**281,980**	3,343,100	**1,487,000**	2.64	3.71	**46.11**	0.37	**4.56**
10.000	**254.00**	3.250	**82.55**	238.80	**355.37**	106,260	**144,060**	206,000	**279,290**	3,208,100	**1,427,000**	2.67	3.65	**45.32**	0.43	**5.35**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
7 5/8 H-90 Low Torque Face																
10.000	**254.00**	3.500	**88.90**	234.29	**348.67**	104,170	**141,230**	196,450	**266,360**	3,062,300	**1,362,100**	2.72	3.58	**44.46**	0.50	**6.21**
10.000	**254.00**	3.750	**95.25**	229.45	**341.46**	98,800	**133,950**	185,970	**252,140**	2,905,700	**1,292,500**	2.78	3.51	**43.55**	0.57	**7.13**
10.250	**260.35**	2.813	**71.44**	259.40	**386.02**	117,110	**158,780**	221,740	**300,640**	3,437,200	**1,528,900**	2.86	3.96	**49.23**	0.32	**4.01**
10.250	**260.35**	3.000	**76.20**	256.49	**381.69**	113,850	**154,360**	215,370	**292,000**	3,343,100	**1,487,000**	2.88	3.92	**48.68**	0.37	**4.56**
10.250	**260.35**	3.250	**82.55**	252.32	**375.49**	109,180	**148,030**	206,260	**279,650**	3,208,100	**1,427,000**	2.92	3.86	**47.88**	0.43	**5.35**
10.250	**260.35**	3.500	**88.90**	247.81	**368.78**	104,170	**141,230**	196,450	**266,360**	3,062,300	**1,362,100**	2.97	3.79	**47.03**	0.50	**6.21**
10.250	**260.35**	3.750	**95.25**	242.97	**361.58**	98,800	**133,950**	185,970	**252,140**	2,905,700	**1,292,500**	3.03	3.71	**46.11**	0.57	**7.13**
10.500	**266.70**	2.813	**71.44**	273.25	**406.64**	117,110	**158,780**	221,740	**300,640**	3,437,200	**1,528,900**	3.11	4.18	**51.86**	0.32	**4.01**
10.500	**266.70**	3.000	**76.20**	270.34	**402.31**	113,850	**154,360**	215,370	**292,000**	3,343,100	**1,487,000**	3.13	4.13	**51.30**	0.37	**4.56**
10.500	**266.70**	3.250	**82.55**	266.17	**396.10**	109,180	**148,030**	206,260	**279,650**	3,208,100	**1,427,000**	3.17	4.07	**50.51**	0.43	**5.35**
10.500	**266.70**	3.500	**88.90**	261.66	**389.39**	104,170	**141,230**	196,450	**266,360**	3,062,300	**1,362,100**	3.23	4.00	**49.66**	0.50	**6.21**
10.500	**266.70**	3.750	**95.25**	256.82	**382.19**	98,800	**133,950**	185,970	**252,140**	2,905,700	**1,292,500**	3.30	3.92	**48.74**	0.57	**7.13**
8 5/8 H-90 Low Torque Face																
10.750	**273.05**	3.000	**76.20**	284.52	**423.42**	92,960 *	**126,030**	181,950	**246,690**	4,453,400	**1,980,900**	2.21	4.35	**54.00**	0.37	**4.56**
10.750	**273.05**	3.250	**82.55**	280.35	**417.21**	92,960 *	**126,030**	181,950	**246,690**	4,318,400	**1,920,900**	2.22	4.28	**53.20**	0.43	**5.35**
10.750	**273.05**	3.500	**88.90**	275.84	**410.50**	92,960 *	**126,030**	181,950	**246,690**	4,172,600	**1,856,000**	2.25	4.22	**52.35**	0.50	**6.21**
10.750	**273.05**	3.750	**95.25**	271.01	**403.30**	92,960 *	**126,030**	181,950	**246,690**	4,016,000	**1,786,400**	2.28	4.14	**51.43**	0.57	**7.13**
11.000	**279.40**	3.000	**76.20**	299.04	**445.02**	110,780 *	**150,200**	216,830	**293,980**	4,453,400	**1,980,900**	2.40	4.57	**56.75**	0.37	**4.56**
11.000	**279.40**	3.250	**82.55**	294.87	**438.81**	110,780 *	**150,200**	216,830	**293,980**	4,318,400	**1,920,900**	2.42	4.51	**55.96**	0.43	**5.35**
11.000	**279.40**	3.500	**88.90**	290.36	**432.11**	110,780 *	**150,200**	216,830	**293,980**	4,172,600	**1,856,000**	2.44	4.44	**55.10**	0.50	**6.21**
11.000	**279.40**	3.750	**95.25**	285.52	**424.91**	110,780 *	**150,200**	216,830	**293,980**	4,016,000	**1,786,400**	2.48	4.36	**54.19**	0.57	**7.13**
11.250	**285.75**	3.000	**76.20**	313.89	**467.12**	129,200 *	**175,170**	252,880	**342,870**	4,453,400	**1,980,900**	2.60	4.80	**59.57**	0.37	**4.56**
11.250	**285.75**	3.250	**82.55**	309.72	**460.91**	129,200 *	**175,170**	252,880	**342,870**	4,318,400	**1,920,900**	2.62	4.73	**58.78**	0.43	**5.35**
11.250	**285.75**	3.500	**88.90**	305.21	**454.21**	129,200 *	**175,170**	252,880	**342,870**	4,172,600	**1,856,000**	2.65	4.66	**57.92**	0.50	**6.21**
11.250	**285.75**	3.750	**95.25**	300.38	**447.01**	129,200 *	**175,170**	252,880	**342,870**	4,016,000	**1,786,400**	2.69	4.59	**57.00**	0.57	**7.13**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
2 3/8 SH																
3.000	**76.20**	1.000	**25.40**	21.36	**31.79**	2,740 *	**3,720**	5,370	**7,280**	283,400	**126,100**	2.54	0.33	**4.05**	0.04	**0.51**
3.000	**76.20**	1.250	**31.75**	19.86	**29.55**	2,430	**3,290**	4,750	**6,440**	234,800	**104,400**	2.77	0.30	**3.77**	0.06	**0.79**
4 SH																
4.500	**114.30**	1.750	**44.45**	45.89	**68.29**	8,470 *	**11,490**	14,920	**20,230**	759,600	**337,900**	1.69	0.70	**8.71**	0.12	**1.55**
4.500	**114.30**	1.875	**47.63**	44.68	**66.49**	8,470 *	**11,490**	14,920	**20,230**	720,500	**320,400**	1.73	0.68	**8.48**	0.14	**1.78**
4.500	**114.30**	2.000	**50.80**	43.39	**64.57**	8,470 *	**11,490**	14,920	**20,230**	678,600	**301,800**	1.78	0.66	**8.23**	0.16	**2.03**
4.500	**114.30**	2.125	**53.98**	42.01	**62.52**	8,470 *	**11,490**	14,920	**20,230**	634,100	**282,000**	1.85	0.64	**7.97**	0.18	**2.29**
4.500	**114.30**	2.250	**57.15**	40.55	**60.35**	8,470 *	**11,490**	14,920	**20,230**	586,800	**261,000**	1.93	0.62	**7.70**	0.21	**2.57**
4.500	**114.30**	2.375	**60.33**	39.01	**58.05**	8,470 *	**11,490**	14,920	**20,230**	536,900	**238,800**	2.04	0.60	**7.40**	0.23	**2.86**
4.500	**114.30**	2.500	**63.50**	37.38	**55.63**	8,310	**11,260**	14,620	**19,830**	484,200	**215,400**	2.19	0.57	**7.09**	0.25	**3.17**
2 3/8 PAC																
3.000	**76.20**	1.000	**25.40**	21.36	**31.79**	3,350	**4,540**	5,900	**8,000**	289,900	**128,900**	2.36	0.33	**4.05**	0.04	**0.51**
3.000	**76.20**	1.250	**31.75**	19.86	**29.55**	2,770	**3,750**	4,870	**6,610**	241,300	**107,300**	2.57	0.30	**3.77**	0.06	**0.79**
3.000	**76.20**	1.500	**38.10**	18.02	**26.82**	2,060	**2,800**	3,630	**4,930**	181,900	**80,900**	3.05	0.28	**3.42**	0.09	**1.14**
3.250	**82.55**	1.000	**25.40**	25.53	**38.00**	3,350	**4,540**	5,900	**8,000**	289,900	**128,900**	3.27	0.39	**4.85**	0.04	**0.51**
3.250	**82.55**	1.250	**31.75**	24.03	**35.76**	2,770	**3,750**	4,870	**6,610**	241,300	**107,300**	3.56	0.37	**4.56**	0.06	**0.79**
3.250	**82.55**	1.500	**38.10**	22.19	**33.03**	2,060	**2,800**	3,630	**4,930**	181,900	**80,900**	4.23	0.34	**4.21**	0.09	**1.14**
2 7/8 PAC																
3.000	**76.20**	1.250	**31.75**	19.86	**29.55**	3,790 *	**5,140**	4,770	**6,470**	303,500	**135,000**	1.74	0.30	**3.77**	0.06	**0.79**
3.000	**76.20**	1.500	**38.10**	18.02	**26.82**	3,790 *	**5,140**	4,770	**6,470**	244,100	**108,600**	1.95	0.28	**3.42**	0.09	**1.14**
3.000	**76.20**	1.750	**44.45**	15.85	**23.59**	2,920	**3,960**	3,670	**4,980**	173,900	**77,300**	2.47	0.24	**3.01**	0.12	**1.55**
3.125	**79.38**	1.250	**31.75**	21.90	**32.59**	4,960 *	**6,730**	6,240	**8,460**	303,500	**135,000**	2.11	0.33	**4.16**	0.06	**0.79**
3.125	**79.38**	1.500	**38.10**	20.07	**29.86**	4,150	**5,620**	5,210	**7,070**	244,100	**108,600**	2.38	0.31	**3.81**	0.09	**1.14**
3.125	**79.38**	1.750	**44.45**	17.90	**26.63**	2,920	**3,960**	3,670	**4,980**	173,900	**77,300**	3.00	0.27	**3.40**	0.12	**1.55**
3.250	**82.55**	1.250	**31.75**	24.03	**35.76**	5,200	**7,050**	6,540	**8,870**	303,500	**135,000**	2.51	0.37	**4.56**	0.06	**0.79**
3.250	**82.55**	1.500	**38.10**	22.19	**33.03**	4,150	**5,620**	5,210	**7,070**	244,100	**108,600**	2.83	0.34	**4.21**	0.09	**1.14**
3.250	**82.55**	1.750	**44.45**	20.03	**29.80**	2,920	**3,960**	3,670	**4,980**	173,900	**77,300**	3.57	0.31	**3.80**	0.12	**1.55**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
3 1/2 PAC																
3.750	**95.25**	1.250	**31.75**	33.38	**49.67**	8,110 *	**11,000**	10,200	**13,830**	526,900	**234,400**	1.91	0.51	**6.33**	0.06	**0.79**
3.750	**95.25**	1.500	**38.10**	31.54	**46.94**	8,110 *	**11,000**	10,200	**13,830**	467,500	**207,900**	2.00	0.48	**5.99**	0.09	**1.14**
3.750	**95.25**	1.750	**44.45**	29.37	**43.71**	7,960	**10,790**	10,010	**13,570**	397,300	**176,700**	2.18	0.45	**5.57**	0.12	**1.55**
3.750	**95.25**	2.000	**50.80**	26.87	**39.98**	6,280	**8,520**	7,900	**10,710**	316,300	**140,700**	2.52	0.41	**5.10**	0.16	**2.03**
4.000	**101.60**	1.250	**31.75**	38.55	**57.37**	10,690	**14,500**	13,450	**18,230**	526,900	**234,400**	2.51	0.59	**7.32**	0.06	**0.79**
4.000	**101.60**	1.500	**38.10**	36.71	**54.63**	9,430	**12,790**	11,860	**16,080**	467,500	**207,900**	2.63	0.56	**6.97**	0.09	**1.14**
4.000	**101.60**	1.750	**44.45**	34.54	**51.41**	7,960	**10,790**	10,010	**13,570**	397,300	**176,700**	2.86	0.53	**6.56**	0.12	**1.55**
4.250	**107.95**	1.250	**31.75**	44.06	**65.56**	10,690	**14,500**	13,450	**18,230**	526,900	**234,400**	3.17	0.67	**8.36**	0.06	**0.79**
2 3/8 OH SW								**2 3/8 OH LW**								
3.063	**77.79**	2.000	**50.80**	14.36	**21.37**	2,820 *	**3,820**	3,540	**4,810**	182,300	**81,100**	1.85	0.22	**2.73**	0.16	**2.03**
3.250	**82.55**	1.250	**31.75**	24.03	**35.76**	4,720 *	**6,410**	5,940	**8,050**	372,200	**165,500**	1.58	0.37	**4.56**	0.06	**0.79**
3.250	**82.55**	1.500	**38.10**	22.19	**33.03**	4,720 *	**6,410**	5,940	**8,050**	333,500	**148,300**	1.71	0.34	**4.21**	0.09	**1.14**
3.250	**82.55**	1.750	**44.45**	20.03	**29.80**	4,720 *	**6,410**	5,940	**8,050**	263,300	**117,100**	1.97	0.31	**3.80**	0.12	**1.55**
3.250	**82.55**	2.000	**50.80**	17.52	**26.08**	3,290	**4,460**	4,140	**5,610**	182,300	**81,100**	2.58	0.27	**3.33**	0.16	**2.03**
3.500	**88.90**	1.250	**31.75**	28.54	**42.47**	7,280	**9,880**	9,160	**12,420**	392,900	**174,700**	2.25	0.44	**5.42**	0.06	**0.79**
3.500	**88.90**	1.500	**38.10**	26.70	**39.73**	6,140	**8,320**	7,720	**10,460**	333,500	**148,300**	2.43	0.41	**5.07**	0.09	**1.14**
3.500	**88.90**	1.750	**44.45**	24.53	**36.51**	4,800	**6,510**	6,040	**8,190**	263,300	**117,100**	2.80	0.37	**4.66**	0.12	**1.55**
2 7/8 OH SW																
3.688	**93.66**	2.000	**50.80**	25.63	**38.14**	6,430 *	**8,720**	8,080	**10,960**	365,000	**162,300**	1.81	0.39	**4.86**	0.16	**2.03**
3.688	**93.66**	2.250	**57.15**	22.79	**33.91**	5,570	**7,550**	7,000	**9,490**	273,200	**121,500**	2.23	0.35	**4.32**	0.21	**2.57**
3.688	**93.66**	2.422	**61.52**	20.64	**30.72**	4,120	**5,590**	5,180	**7,030**	203,900	**90,700**	2.81	0.32	**3.92**	0.24	**2.97**
3.750	**95.25**	2.000	**50.80**	26.87	**39.98**	7,280 *	**9,870**	9,150	**12,410**	365,000	**162,300**	1.97	0.41	**5.10**	0.16	**2.03**
3.750	**95.25**	2.250	**57.15**	24.03	**35.76**	5,570	**7,550**	7,000	**9,490**	273,200	**121,500**	2.42	0.37	**4.56**	0.21	**2.57**
3.750	**95.25**	2.422	**61.52**	21.89	**32.57**	4,120	**5,590**	5,180	**7,030**	203,900	**90,700**	3.06	0.33	**4.15**	0.24	**2.97**
4.000	**101.60**	2.000	**50.80**	32.04	**47.68**	7,510	**10,180**	9,440	**12,800**	365,000	**162,300**	2.66	0.49	**6.08**	0.16	**2.03**
4.000	**101.60**	2.250	**57.15**	29.20	**43.46**	5,570	**7,550**	7,000	**9,490**	273,200	**121,500**	3.27	0.45	**5.54**	0.21	**2.57**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
2 7/8 OH LW																
3.688	**93.66**	2.000	**50.80**	25.63	**38.14**	6,450 *	**8,750**	8,110	**11,000**	365,000	**162,300**	1.75	0.39	**4.86**	0.16	**2.03**
3.688	**93.66**	2.250	**57.15**	22.79	**33.91**	5,590	**7,580**	7,030	**9,530**	273,200	**121,500**	2.15	0.35	**4.32**	0.21	**2.57**
3.688	**93.66**	2.422	**61.52**	20.64	**30.72**	4,140	**5,610**	5,200	**7,060**	203,900	**90,700**	2.71	0.32	**3.92**	0.24	**2.97**
3.750	**95.25**	2.000	**50.80**	26.87	**39.98**	7,300 *	**9,910**	9,180	**12,450**	365,000	**162,300**	1.91	0.41	**5.10**	0.16	**2.03**
3.750	**95.25**	2.250	**57.15**	24.03	**35.76**	5,590	**7,580**	7,030	**9,530**	273,200	**121,500**	2.34	0.37	**4.56**	0.21	**2.57**
3.750	**95.25**	2.422	**61.52**	21.89	**32.57**	4,140	**5,610**	5,200	**7,060**	203,900	**90,700**	2.96	0.33	**4.15**	0.24	**2.97**
4.000	**101.60**	2.000	**50.80**	32.04	**47.68**	7,540	**10,220**	9,470	**12,850**	365,000	**162,300**	2.60	0.49	**6.08**	0.16	**2.03**
4.000	**101.60**	2.250	**57.15**	29.20	**43.46**	5,590	**7,580**	7,030	**9,530**	273,200	**121,500**	3.19	0.45	**5.54**	0.21	**2.57**
3 1/2 OH SW **3 1/2 OH LW**																
4.500	**114.30**	2.500	**63.50**	37.38	**55.63**	10,670 *	**14,470**	13,420	**18,190**	587,200	**261,200**	1.56	0.57	**7.09**	0.25	**3.17**
4.500	**114.30**	2.750	**69.85**	33.88	**50.41**	10,670 *	**14,470**	13,420	**18,190**	473,800	**210,700**	1.81	0.52	**6.43**	0.31	**3.83**
4.500	**114.30**	2.906	**73.82**	31.52	**46.90**	9,810	**13,300**	12,340	**16,730**	397,400	**176,800**	2.07	0.48	**5.98**	0.34	**4.28**
4.500	**114.30**	3.000	**76.20**	30.04	**44.70**	8,600	**11,660**	10,810	**14,660**	349,600	**155,500**	2.29	0.46	**5.70**	0.37	**4.56**
4.750	**120.65**	2.500	**63.50**	43.55	**64.82**	14,680	**19,910**	18,460	**25,030**	587,200	**261,200**	2.05	0.67	**8.27**	0.25	**3.17**
4.750	**120.65**	2.750	**69.85**	40.05	**59.60**	11,760	**15,940**	14,780	**20,050**	473,800	**210,700**	2.38	0.61	**7.60**	0.31	**3.83**
4.750	**120.65**	2.906	**73.81**	37.69	**56.10**	9,810	**13,310**	12,340	**16,730**	397,500	**176,800**	2.72	0.58	**7.15**	0.34	**4.28**
4.750	**120.65**	3.000	**76.20**	36.21	**53.89**	8,600	**11,660**	10,810	**14,660**	349,600	**155,500**	3.01	0.55	**6.87**	0.37	**4.56**
4 OH SW																
5.750	**146.05**	2.500	**63.50**	71.59	**106.54**	30,260 *	**41,020**	38,040	**51,580**	1,057,400	**470,300**	1.98	1.09	**13.59**	0.25	**3.17**
5.750	**146.05**	2.750	**69.85**	68.09	**101.32**	27,530	**37,330**	34,610	**46,930**	944,100	**419,900**	2.11	1.04	**12.92**	0.31	**3.83**
5.750	**146.05**	3.000	**76.20**	64.25	**95.61**	23,770	**32,230**	29,880	**40,520**	819,900	**364,700**	2.30	0.98	**12.19**	0.37	**4.56**
5.750	**146.05**	3.250	**82.55**	60.08	**89.40**	19,730	**26,750**	24,800	**33,630**	684,900	**304,600**	2.61	0.92	**11.40**	0.43	**5.35**
5.750	**146.05**	3.500	**88.90**	55.57	**82.70**	15,410	**20,900**	19,380	**26,270**	539,100	**239,800**	3.13	0.85	**10.55**	0.50	**6.21**
6.000	**152.40**	2.500	**63.50**	79.43	**118.21**	31,000	**42,030**	38,970	**52,840**	1,057,400	**470,300**	2.38	1.21	**15.07**	0.25	**3.17**
6.000	**152.40**	2.750	**69.85**	75.93	**112.99**	27,530	**37,330**	34,610	**46,930**	944,100	**419,900**	2.53	1.16	**14.41**	0.31	**3.83**
6.000	**152.40**	3.000	**76.20**	72.09	**107.28**	23,770	**32,230**	29,880	**40,520**	819,900	**364,700**	2.76	1.10	**13.68**	0.37	**4.56**
6.000	**152.40**	3.250	**82.55**	67.92	**101.07**	19,730	**26,750**	24,800	**33,630**	684,900	**304,600**	3.13	1.04	**12.89**	0.43	**5.35**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
4 OH SW																
6.250	**158.75**	2.500	**63.50**	87.61	**130.38**	31,000	**42,030**	38,970	**52,840**	1,057,400	**470,300**	2.81	1.34	**16.63**	0.25	**3.17**
6.250	**158.75**	2.750	**69.85**	84.11	**125.16**	27,530	**37,330**	34,610	**46,930**	944,100	**419,900**	2.99	1.29	**15.96**	0.31	**3.83**
6.250	**158.75**	3.000	**76.20**	80.27	**119.45**	23,770	**32,230**	29,880	**40,520**	819,900	**364,700**	3.26	1.23	**15.23**	0.37	**4.56**
6.500	**165.10**	2.250	**57.15**	99.29	**147.76**	34,170	**46,320**	42,950	**58,240**	1,160,000	**516,000**	3.13	1.52	**18.84**	0.21	**2.57**
6.500	**165.10**	2.500	**63.50**	96.12	**143.04**	31,000	**42,030**	38,970	**52,840**	1,057,400	**470,300**	3.27	1.47	**18.24**	0.25	**3.17**
4 OH LW																
5.750	**146.05**	2.500	**63.50**	71.59	**106.54**	30,360 *	**41,160**	38,160	**51,740**	1,057,400	**470,300**	1.94	1.09	**13.59**	0.25	**3.17**
5.750	**146.05**	2.750	**69.85**	68.09	**101.32**	27,620	**37,450**	34,730	**47,090**	944,100	**419,900**	2.06	1.04	**12.92**	0.31	**3.83**
5.750	**146.05**	3.000	**76.20**	64.25	**95.61**	23,850	**32,340**	29,980	**40,650**	819,900	**364,700**	2.25	0.98	**12.19**	0.37	**4.56**
5.750	**146.05**	3.250	**82.55**	60.08	**89.40**	19,790	**26,840**	24,880	**33,740**	684,900	**304,600**	2.55	0.92	**11.40**	0.43	**5.35**
5.750	**146.05**	3.500	**88.90**	55.57	**82.70**	15,460	**20,970**	19,440	**26,360**	539,100	**239,800**	3.06	0.85	**10.55**	0.50	**6.21**
6.000	**152.40**	2.500	**63.50**	79.43	**118.21**	31,100	**42,170**	39,100	**53,020**	1,057,400	**470,300**	2.34	1.21	**15.07**	0.25	**3.17**
6.000	**152.40**	2.750	**69.85**	75.93	**112.99**	27,620	**37,450**	34,730	**47,090**	944,100	**419,900**	2.49	1.16	**14.41**	0.31	**3.83**
6.000	**152.40**	3.000	**76.20**	72.09	**107.28**	23,850	**32,340**	29,980	**40,650**	819,900	**364,700**	2.71	1.10	**13.68**	0.37	**4.56**
6.000	**152.40**	3.250	**82.55**	67.92	**101.07**	19,790	**26,840**	24,880	**33,740**	684,900	**304,600**	3.08	1.04	**12.89**	0.43	**5.35**
6.250	**158.75**	2.500	**63.50**	87.61	**130.38**	31,100	**42,170**	39,100	**53,020**	1,057,400	**470,300**	2.77	1.34	**16.63**	0.25	**3.17**
6.250	**158.75**	2.750	**69.85**	84.11	**125.16**	27,620	**37,450**	34,730	**47,090**	944,100	**419,900**	2.94	1.29	**15.96**	0.31	**3.83**
6.250	**158.75**	3.000	**76.20**	80.27	**119.45**	23,850	**32,340**	29,980	**40,650**	819,900	**364,700**	3.21	1.23	**15.23**	0.37	**4.56**
4 1/2 OH SW								**4 1/2 OH LW**								
6.000	**152.40**	3.000	**76.20**	72.09	**107.28**	32,060 *	**43,460**	40,300	**54,640**	1,079,300	**480,100**	1.80	1.10	**13.68**	0.37	**4.56**
6.000	**152.40**	3.250	**82.55**	67.92	**101.07**	29,270	**39,680**	36,800	**49,890**	944,300	**420,000**	1.96	1.04	**12.89**	0.43	**5.35**
6.000	**152.40**	3.500	**88.90**	63.41	**94.37**	24,600	**33,350**	30,920	**41,930**	798,500	**355,200**	2.20	0.97	**12.03**	0.50	**6.21**
6.000	**152.40**	3.750	**95.25**	58.57	**87.17**	19,640	**26,620**	24,690	**33,470**	641,900	**285,500**	2.60	0.90	**11.12**	0.57	**7.13**
6.250	**158.75**	3.000	**76.20**	80.27	**119.45**	33,640	**45,610**	42,290	**57,340**	1,079,300	**480,100**	2.18	1.23	**15.23**	0.37	**4.56**
6.250	**158.75**	3.250	**82.55**	76.10	**113.24**	29,270	**39,680**	36,800	**49,890**	944,300	**420,000**	2.37	1.16	**14.44**	0.43	**5.35**
6.250	**158.75**	3.500	**88.90**	71.59	**106.54**	24,600	**33,350**	30,920	**41,930**	798,500	**355,200**	2.66	1.09	**13.59**	0.50	**6.21**
6.250	**158.75**	3.750	**95.25**	66.75	**99.33**	19,640	**26,620**	24,690	**33,470**	641,900	**285,500**	3.14	1.02	**12.67**	0.57	**7.13**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
4 1/2 OH SW 4 1/2 OH LW																
6.500	**165.10**	3.000	**76.20**	88.78	**132.12**	33,640	**45,610**	42,290	**57,340**	1,079,300	**480,100**	2.58	1.36	**16.85**	0.37	**4.56**
6.500	**165.10**	3.250	**82.55**	84.61	**125.91**	29,270	**39,680**	36,800	**49,890**	944,300	**420,000**	2.80	1.29	**16.06**	0.43	**5.35**
6.500	**165.10**	3.500	**88.90**	80.10	**119.20**	24,600	**33,350**	30,920	**41,930**	798,500	**355,200**	3.15	1.22	**15.20**	0.50	**6.21**
6.750	**171.45**	3.000	**76.20**	97.62	**145.28**	33,640	**45,610**	42,290	**57,340**	1,079,300	**480,100**	3.01	1.49	**18.53**	0.37	**4.56**
2 3/8 WO																
3.500	**88.90**	1.000	**25.40**	30.04	**44.70**	7,110 *	**9,640**	8,940	**12,120**	429,700	**191,100**	2.24	0.46	**5.70**	0.04	**0.51**
3.500	**88.90**	1.250	**31.75**	28.54	**42.47**	7,080	**9,600**	8,900	**12,070**	381,100	**169,500**	2.34	0.44	**5.42**	0.06	**0.79**
3.500	**88.90**	1.500	**38.10**	26.70	**39.73**	5,930	**8,050**	7,460	**10,120**	321,700	**143,100**	2.54	0.41	**5.07**	0.09	**1.14**
3.500	**88.90**	1.750	**44.45**	24.53	**36.51**	4,600	**6,240**	5,780	**7,840**	251,500	**111,800**	2.95	0.37	**4.66**	0.12	**1.55**
3.750	**95.25**	1.000	**25.40**	34.88	**51.90**	8,030	**10,890**	10,100	**13,690**	429,700	**191,100**	2.99	0.53	**6.62**	0.04	**0.51**
3.750	**95.25**	1.250	**31.75**	33.38	**49.67**	7,080	**9,600**	8,900	**12,070**	381,100	**169,500**	3.12	0.51	**6.33**	0.06	**0.79**
2 7/8 WO																
4.250	**107.95**	1.250	**31.75**	44.06	**65.56**	13,280 *	**18,010**	16,700	**22,650**	622,000	**276,600**	2.39	0.67	**8.36**	0.06	**0.79**
4.250	**107.95**	1.500	**38.10**	42.22	**62.83**	12,150	**16,480**	15,280	**20,710**	562,600	**250,200**	2.48	0.65	**8.01**	0.09	**1.14**
4.250	**107.95**	1.750	**44.45**	40.05	**59.60**	10,570	**14,330**	13,290	**18,020**	492,400	**219,000**	2.63	0.61	**7.60**	0.12	**1.55**
4.250	**107.95**	2.000	**50.80**	37.55	**55.88**	8,770	**11,890**	11,020	**14,950**	411,400	**183,000**	2.92	0.57	**7.13**	0.16	**2.03**
4.500	**114.30**	1.250	**31.75**	49.90	**74.25**	13,500	**18,310**	16,970	**23,020**	622,000	**276,600**	3.00	0.76	**9.47**	0.06	**0.79**
4.500	**114.30**	1.500	**38.10**	48.06	**71.52**	12,150	**16,480**	15,280	**20,710**	562,600	**250,200**	3.11	0.73	**9.12**	0.09	**1.14**
3 1/2 WO																
5.000	**127.00**	1.750	**44.45**	58.57	**87.17**	19,620 *	**26,610**	24,670	**33,450**	884,600	**393,400**	2.06	0.90	**11.12**	0.12	**1.55**
5.000	**127.00**	2.000	**50.80**	56.07	**83.44**	19,620 *	**26,610**	24,670	**33,450**	803,600	**357,400**	2.14	0.86	**10.64**	0.16	**2.03**
5.000	**127.00**	2.250	**57.15**	53.23	**79.22**	18,160	**24,620**	22,830	**30,950**	711,800	**316,600**	2.28	0.81	**10.10**	0.21	**2.57**
5.000	**127.00**	2.500	**63.50**	50.06	**74.50**	15,440	**20,940**	19,410	**26,320**	609,200	**270,900**	2.50	0.76	**9.50**	0.25	**3.17**
5.000	**127.00**	2.750	**69.85**	46.56	**69.29**	12,470	**16,920**	15,680	**21,270**	495,800	**220,500**	2.88	0.71	**8.84**	0.31	**3.83**
5.250	**133.35**	1.750	**44.45**	65.42	**97.35**	25,470 *	**34,530**	28,660	**38,860**	884,600	**393,400**	2.52	1.00	**12.41**	0.12	**1.55**
5.250	**133.35**	2.000	**50.80**	62.91	**93.62**	20,610	**27,950**	25,910	**35,140**	803,600	**357,400**	2.62	0.96	**11.94**	0.16	**2.03**
5.250	**133.35**	2.250	**57.15**	60.08	**89.40**	18,160	**24,620**	22,830	**30,950**	711,800	**316,600**	2.79	0.92	**11.40**	0.21	**2.57**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
3 1/2 WO																
5.250	**133.35**	2.500	**63.50**	56.90	**84.68**	15,440	**20,940**	19,410	**26,320**	609,200	**270,900**	3.06	0.87	**10.80**	0.25	**3.17**
5.500	**139.70**	1.750	**44.45**	72.59	**108.03**	22,800	**30,910**	28,660	**38,860**	884,600	**393,400**	3.02	1.11	**13.78**	0.12	**1.55**
5.500	**139.70**	2.000	**50.80**	70.09	**104.30**	20,610	**27,950**	25,910	**35,140**	803,600	**357,400**	3.14	1.07	**13.30**	0.16	**2.03**
4 WO																
6.000	**152.40**	2.500	**63.50**	79.43	**118.21**	32,790 *	**44,450**	41,220	**55,880**	1,182,500	**526,000**	2.07	1.21	**15.07**	0.25	**3.17**
6.000	**152.40**	2.750	**69.85**	75.93	**112.99**	32,340	**43,850**	40,660	**55,130**	1,069,100	**475,500**	2.18	1.16	**14.41**	0.31	**3.83**
6.000	**152.40**	3.000	**76.20**	72.09	**107.28**	28,430	**38,550**	35,740	**48,460**	944,900	**420,300**	2.34	1.10	**13.68**	0.37	**4.56**
6.000	**152.40**	3.250	**82.55**	67.92	**101.07**	24,220	**32,850**	30,450	**41,290**	809,900	**360,200**	2.59	1.04	**12.89**	0.43	**5.35**
6.000	**152.40**	3.500	**88.90**	63.41	**94.37**	19,730	**26,750**	24,810	**33,630**	664,100	**295,400**	3.00	0.97	**12.03**	0.50	**6.21**
6.250	**158.75**	2.500	**63.50**	87.61	**130.38**	35,940	**48,730**	45,180	**61,260**	1,182,500	**526,000**	2.44	1.34	**16.63**	0.25	**3.17**
6.250	**158.75**	2.750	**69.85**	84.11	**125.16**	32,340	**43,850**	40,660	**55,130**	1,069,100	**475,500**	2.57	1.29	**15.96**	0.31	**3.83**
6.250	**158.75**	3.000	**76.20**	80.27	**119.45**	28,430	**38,550**	35,740	**48,460**	944,900	**420,300**	2.77	1.23	**15.23**	0.37	**4.56**
6.250	**158.75**	3.250	**82.55**	76.10	**113.24**	24,220	**32,850**	30,450	**41,290**	809,900	**360,200**	3.06	1.16	**14.44**	0.43	**5.35**
6.500	**165.10**	2.500	**63.50**	96.12	**143.04**	35,940	**48,730**	45,180	**61,260**	1,182,500	**526,000**	2.85	1.47	**18.24**	0.25	**3.17**
6.500	**165.10**	2.750	**69.85**	92.62	**137.83**	32,340	**43,850**	40,660	**55,130**	1,069,100	**475,500**	3.00	1.42	**17.58**	0.31	**3.83**
6.750	**171.45**	2.500	**63.50**	104.96	**156.20**	35,940	**48,730**	45,180	**61,260**	1,182,500	**526,000**	3.28	1.60	**19.92**	0.25	**3.17**
4 1/2 WO																
6.750	**171.45**	2.500	**63.50**	104.96	**156.20**	50,150	**67,990**	63,040	**85,480**	1,518,100	**675,300**	2.24	1.60	**19.92**	0.25	**3.17**
6.750	**171.45**	2.750	**69.85**	101.46	**150.99**	46,220	**62,670**	58,110	**78,780**	1,404,700	**624,800**	2.32	1.55	**19.25**	0.31	**3.83**
6.750	**171.45**	3.000	**76.20**	97.62	**145.28**	41,950	**56,870**	52,730	**71,500**	1,280,500	**569,600**	2.43	1.49	**18.53**	0.37	**4.56**
6.750	**171.45**	3.250	**82.55**	93.45	**139.07**	37,340	**50,630**	46,940	**63,650**	1,145,600	**509,500**	2.60	1.43	**17.73**	0.43	**5.35**
6.750	**171.45**	3.500	**88.90**	88.94	**132.36**	32,410	**43,950**	40,750	**55,250**	999,800	**444,700**	2.84	1.36	**16.88**	0.50	**6.21**
6.750	**171.45**	3.750	**95.25**	84.11	**125.16**	27,170	**36,840**	34,160	**46,310**	843,200	**375,000**	3.20	1.29	**15.96**	0.57	**7.13**
7.000	**177.80**	2.500	**63.50**	114.14	**169.86**	50,150	**67,990**	63,040	**85,480**	1,518,100	**675,300**	2.59	1.74	**21.66**	0.25	**3.17**
7.000	**177.80**	2.750	**69.85**	110.64	**164.65**	46,220	**62,670**	58,110	**78,780**	1,404,700	**624,800**	2.68	1.69	**21.00**	0.31	**3.83**
7.000	**177.80**	3.000	**76.20**	106.80	**158.94**	41,950	**56,870**	52,730	**71,500**	1,280,500	**569,600**	2.81	1.63	**20.27**	0.37	**4.56**
7.000	**177.80**	3.250	**82.55**	102.63	**152.73**	37,340	**50,630**	46,940	**63,650**	1,145,600	**509,500**	3.00	1.57	**19.48**	0.43	**5.35**

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MECHANICAL PROPERTIES OF DRILL COLLARS

Outside Diameter		Inside Diameter		Nominal Weight		Recommended Make-up Torque		Torque to Yield Connection		Tensile Strength of Connection		BSR	Displ.		Capacity	
in	mm	in	mm	lb/ft	kg/m	ft.lb	N.m	ft.lb	N.m	lb	daN		gal/ft	L/m	gal/ft	L/m
4 1/2 WO																
7.250	**184.15**	2.500	**63.50**	123.65	**184.02**	50,150	**67,990**	63,040	**85,480**	1,518,100	**675,300**	2.96	1.89	**23.47**	0.25	**3.17**
7.250	**184.15**	2.750	**69.85**	120.15	**178.80**	46,220	**62,670**	58,110	**78,780**	1,404,700	**624,800**	3.07	1.84	**22.80**	0.31	**3.83**

Notes:

1. **Make Up Torque figures preceded by an astrik (*) indicate that the weaker member for the corresponding outside diameter (OD) and bore is the box; for all other torque values, the weaker member is the pin.**
2. **The Recommeded Make up Torque values are based on a unit stress of 62,500 psi (87,500 psi for 2-7/8 PAC & 56,200 psi for H-90 connections).**
3. **Stress-relief features are disregarded for make up torque for all connections.**
4. **Stress-relief features are considered in the Torque to Yield and the Tensile Strength of all connections NC38(3-1/2 IF) and larger.**
5. **Normal make up torque range is tabulated values plus 10%.**

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SLIP AND ELEVATOR RECESSES

Slip and elevator recesses eliminate the need for lift subs and safety clamps and therefore cut drill collar handling time. Careful machining produces smooth radii that are free of tool marks. The radii are also cold rolled at the upper shoulders to help strengthen the machined areas.

RECOMMENDED SLIP AND ELEVATOR RECESS DIAMETERS

A Collar O.D.	B Elevator Diameter	C Slip Recess Diameter	R Elevator Recess Radius	Top Elevator Bore	Lower Hall Elevator Bore
4-1/8	3-11/16	3-3/4	1/8	3-3/16	4-1/4
4-3/4	4-1/4	4-3/8	1/8	4-3/8	4-7/8
5-3/4	5-1/8	5-1/4	1/8	5-1/4	5-7/8
6	5-3/8	5-1/2	1/8	5-1/2	6-1/8
6-1/4	5-5/8	5-3/4	1/8	5-3/4	6-3/8
6-1/2	5-7/8	6	1/8	6	6-5/8
6-3/4	6	6-1/4	3/16	6-3/16	6-7/8
7	6-1/4	6-1/2	3/16	6-7/16	7-1/8
7-1/4	6-1/2	6-3/4	3/16	6-11/16	7-3/8
7-1/2	6-3/4	7	3/16	6-15/16	7-5/8
7-3/4	7	7-1/4	3/16	7-3/16	7-7/8
8	7-1/4	7-1/2	3/16	7-7/16	8-1/8
9	8-1/8	8-1/2	1/4	8-3/8	9-1/8
9-1/2	8-5/8	9	1/4	8-7/8	9-5/8
9-3/4	8-7/8	9-1/4	1/4	9-1/8	9-7/8
10	9-1/8	9-1/2	1/4	9-3/8	10-1/8

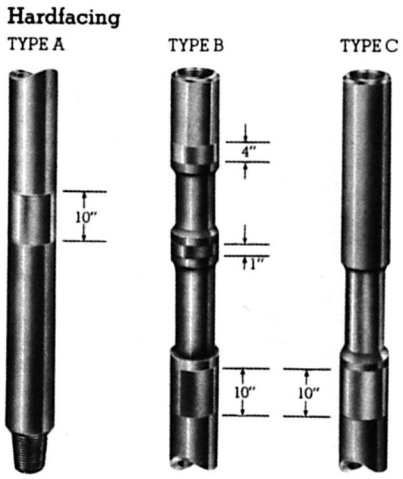
All dimensions are given in inches.

STRESS RELIEF FOR FLEXIBILITY

By eliminating unengaged threads in the pin and box, highly stressed areas of the drill collar joint are relieved. This produces a flexible joint which is more resistant to fatigue cracking. Bending in the joint occurs in the smooth, stress relief areas.

When ordering or requesting quotation, please state:

1. O.D. - bore-length.
2. Size and type of connection (both ends) and special connection features.
3. Surface finish.
4. Additional features such as elevator and slip recesses.
5. Slick or spiral grooved.
6. Type of hard metal application.



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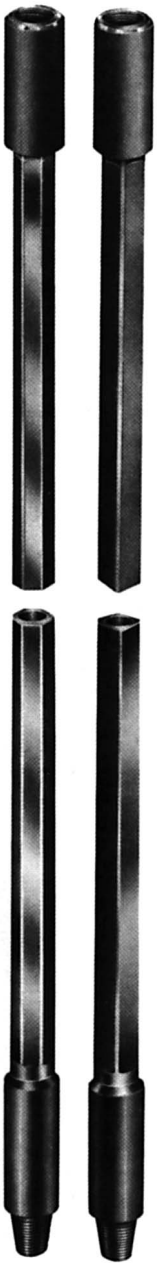
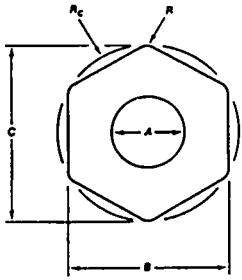
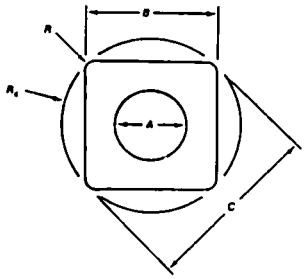


KELLY LENGTHS

A.P.I. kellys are manufactured in two standard lengths; (1) 40 ft. **(12.2m)** overall with a 37 ft. **(11.3m)** working space or (2) 54 ft. **(16.5m)** overall with a 51 ft. **(15.5m)** working space.





Guideline for Longer Kelly Life

1. Kellys should be broken in with new drive-bushing roller assemblies to develope essentially flat wear patterns on the driving edge of the kelly.
2. Replace drive assemblies periodically to insure that clearance from wear in minimized.
3. Use a saver sub to protect lower connection threads from excessive wear as repeated joints of drill pipe are made up and broken out.
4. Always use supplied scabbard to protect and support kelly during transportation or storage.
5. Periodic visual inspection is highly recommended.
6. Rebuilding of drive corners by welding is not recommended because it creates heat affected areas.

Ordering Information

When ordering or requesting quotation, please specify:

1. Hexagonal or square kelly
2. Nominal size, length, bore
3. Size and type of top connection
4. Size and type of bottom connection
5. Top and bottom upset O.D.'s
6. If other than plain shipping scabbard is desired, (rathole drilling scabbards available).

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SQUARE KELLYS

API Nom. Size in **mm**	Top Connection Std. (LH)	Top Connection Optional (LH)	Top OD in **mm** Std.	Top OD in **mm** Optional	Bottom Conn Std. (RH)	Bottom OD in **mm** Std.	Bore A	Across Flats B	Across Corner C	Radius R*	Radius RC	Approx. Wt. Of 40 ft. **(12.2 M)** Length lbs. **kg**.
2 1/2 **63.5**	6 5/8 Reg.	4 1/2 Reg.	7 3/4 196.9	5 3/4 146.1	2 3/8 IF NC-26	3 3/8 **85.7**	1 1/4 **31.8**	2 1/2 **63.5**	3.250 **82.6**	5/16 **7.94**	1 5/8 **41.3**	910 **413**
3 **76.2**					2 7/8 IF NC-31	4 1/8 **104.8**	1 3/4 **44.5**	3 **76.2**	3.875 **98.4**	3/8 **9.53**	1 15/16 **49.2**	1080 **490**
3 1/2 **88.9**					3 1/2 IF NC-38	4 3/4 **120.7**	2 1/4 **57.2**	3 1/2 **88.9**	4.437 **112.7**	1/2 **12.70**	2 7/32 **56.4**	1320 **599**
4 1/4 **108.0**					4 IF NC-46	6 1/4 158.7	2 13/16	4 1/4	5.500	1/2	2 3/4	1820
					4 1/2 IF NC-50	6 3/8 161.9	**71.4**	**108.0**	**139.7**	**12.70**	**69.9**	**826**
5 1/4 **133.4**					5 1/2 FH NC-56	7 **177.8**	3 1/4 **82.6**	5 1/4 **133.3**	6.750 **171.5**	5/8 **15.88**	3 3/8 **85.7**	2780 **1261**
** 6 **152.4**					6 5/8 FH	8 **203.2**	3 1/2 **88.9**	6 **152.4**	7.625 **193.7**	3/4 **19.05**	3 13/16 **96.8**	3710 **1683**

* Corner Configuration at Manufacturer's Option

** "6" not API

HEXAGON KELLYS

API Nom. Size in **mm**	Top Connection Std. (LH)	Top Connection Optional (LH)	Top OD in **mm** Std.	Top OD in **mm** Optional	Bottom Conn Std. (RH)	Bottom OD in **mm** Std.	Bore A	Across Flats B	Across Corner C	Radius R*	Radius RC	Approx. Wt. Of 40 ft. **(12.2 M)** Length lbs. **kg**.
3 **76.2**	6 5/8 Reg.	4 1/2 Reg.	7 3/4 196.9	5 3/4 146.1	2 3/8 IF NC-26	3 3/8 **85.7**	1 1/2 **38.1**	3 **76.2**	3.375 **85.73**	1/4 **6.35**	1 11/16 **42.86**	1018 **462**
3 1/2 **88.9**					2 7/8 IF NC-31	4 1/8 **104.8**	1 7/8 **47.6**	3 1/2 **88.9**	3.937 **99.99**	1/4 **6.35**	1 31/32 **50.00**	1300 **590**
4 1/4 **108.0**					3 1/2 IF NC-38	4 3/4 **120.7**	2 1/4 **57.2**	4 1/4 **108.0**	4.781 **121.44**	5/16 **7.94**	2 25/64 **60.72**	1740 **789**
5 1/4 **133.4**					4 IF NC-46	6 1/4 **158.7**	3 **76.2**	5 1/4	5.900	3/8	2 61/64	2550
					4 1/2 IF NC-50	6 3/8 **161.9**	**3 1/4** **82.6**	**133.3**	**149.86**	**9.53**	**75.00**	**1157**
6 **152.4**					5 1/2 FH NC-56	7 **177.8**	3 1/2 **88.9**	6 **152.4**	6.812 **173.03**	3/8 **9.53**	3 13/32 **86.52**	3360 **1524**

* Corner Configuration at Manufacturer's Option

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KELLY WEIGHTS
POUNDS PER FOOT
(Drive Section)

SQUARE KELLY

Across Flat	Bore of Square Kelly											
	1-1/16	1-1/4	1-1/2	1-3/4	2	2-1/4	2-1/2	2-3/4	2-7/8	3	3-1/4	3-1/2
2-1/2	18.3	17.1										
3		25.8	24.0	21.8								
3-1/2			35.6	33.5	31.0	28.2						
4-1/4						47.9	44.7	41.3	39.3			
5-1/4								73.5	71.6	69.7	65.5	
6												89.6

HEXAGON KELLYS

Across Flat	Bore of Square Kelly											
	1-1/4	1-1/2	1-3/4	2	2-1/4	2-1/2	2-3/4	2-7/8	3	3-1/4	3-1/2	4
3	22.3	20.5										
3-1/2		30.1	27.9	25.4	22.6							
3-3/4		35.3	33.2	30.7	27.9							
4-1/4					39.6	36.4	32.9	31.0				
4-27/32					56.4	53.3	49.8	47.9	45.9	41.7		
5-1/4							60.9	59.0	57.1	52.9	48.4	
6											73.2	63.2

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STRENGTH OF KELLYS [1]

Kelly Size and Type	Kelly Bore	Lower Pin Connection		Minimum [2] Recomm. Casing O.D.	Tensile Yield		Torsional Yield		Yield in Bending Through Drive Section	Internal Pressure At Minimum Yield Drive Section
		Size and Style	O.D.		Lower Pin Connection [3]	Drive Section	Lower Pin Connection	Drive Section		
in.	in.		in.	in.	lb.	lb.	ft.lb	ft.lb	ft.lb	psi
2 1/2 Sq	1 1/4	NC26 (2 3/8 IF)	3 3/8	4 1/2	416,000	444,400	9,650	12,300	13,000	29,800
3 Sq	1 3/4	NC31 (2 7/8 IF)	4 1/8	5 1/2	535,000	582,500	14,450	19,500	22,300	25,500
3 1/2 Sq	2 1/4	NC38 (3 1/2 IF)	4 3/4	6 5/8	724,000	725,200	22,700	28,300	34,200	22,200
4 1/4 Sq	2 13/16	NC46 (4 IF)	6 1/4	8 5/8	1,054,000	1,047,000	39,350	49,100	60,300	19,500
4 1/4 Sq	2 13/16	NC50 (4 1/2 IF)	6 3/8	8 5/8	1,375,200	1,047,000	55,810	49,100	60,300	19,500
5 1/4 Sq	3 1/4	5 1/2 FH	7	9 5/8	1,609,000	1,703,400	72,950	99,400	117,000	20,600
3 Hex	1 1/2	NC26 (2 3/8 IF)	3 3/8	4 1/2	356,000	540,500	8,300	20,400	20,000	26,700
3 1/2 Hex	1 7/8	NC31 (2 7/8 IF)	4 1/8	5 1/2	495,000	710,000	13,400	31,400	31,200	25,500
4 1/4 Hex	2 1/4	NC38 (3 1/2 IF)	4 3/4	6 5/8	724,000	1,046,600	22,700	56,600	56,000	25,000
5 1/4 Hex	3	NC46 (4 IF)	6 1/4	8 5/8	960,000	1,507,600	35,450	101,900	103,000	20,600
5 1/4 Hex	3 1/4	NC50 (4 1/2 IF)	6 3/8	8 5/8	1,162,000	1,397,100	46,750	95,500	99,300	20,600
6 Hex	3 1/2	5 1/2 FH	7	9 5/8	1,463,000	1,935,500	66,350	149,800	152,500	18,200

[1] All valves have a safety factor of 1.0 and are based on 110,000 psi minmum tensile yield (quenched and tempered) for connections and 90,000 psi minimum tensile yield (normalized and tempered) for the drive section. Fully quenched and tempered drive sections will have higher values than those shown. Shear strength is based on 57.7 percent of the minimum tensile yield strength.

[2] Clearance between protector rubber on kelly saver sub and casing inside diameter should also be checked.

[3] Tensile area calculated at root of thread 3/4 inch from pin shoulder. Reference RP7G Sixteenth Edition, August 1998, Table 15.

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RATED CAPACITY OF ELEVATORS & SPIDERS

BJ L.Y.T.	20 Tons
BJ M.Y.T	40 Tons
BJ Type YT	75 Tons
BJ Type YC Tubing Elevators	75 Tons
BJ Slip Grip Casing Elevators 7-5/8"	150 Tons
BJ Slip Casing Elevators 10-3/4"	200 Tons
BJ Slip Grip Casing Elevators 13-3/8"	200 Tons
10-3/4" BJ Slip Grip Casing Elevators and/or Spider	500 Tons
13-3/8" BJ Casing Spider	400 Tons

RATED CAPACITIES IN TONS

Size (O.D.)	AA	MAA	RA	LA	LLA	XLA
1.66" - 2-7/8"		175	125	75	65	45
3-1/2"	250	175	125	75	65	45
4" - 4-1/2"	275	225	150	100		
5"	300	250	175	125		
5-1/2"	300	250	175	125		
6-5/8" - 7"	300	250	175	125		

"G" SERIES ELEVATORS
Rated Capacities in Tons

Size (O.D.)	GC	MGG	RG	MG
2-3/8"	-	-	150	100
2-7/8"	-	-	150	100
3-1/2" (FH & IF) . . .	-	250	-	100
4"	350	250	-	100
4-1/2" (Reg. & FH) .	350	250	-	100
5", 4-1/2" (IF)	350	250	-	100
5-1/2"	350	250	-	-

BJ TYPE "X" SIDE DOOR ELEVATORS
Rated Capacities in Tons

	Side Door Type			
Size (O.D.)	Light Weight	Extra Heavy	Double Extra Heavy	Triple Extra Heavy
1.66" - 2-7/8"		35	60	
3-1/2"		35	75	
4"- 4-3/4"	30	50	90	
5" - 5-3/4"	35	60	100	
6" - 7"	50	75	125	
7-5/8" - 11-3/4"	60	90	125	150
13-3/8"	60	75	125	150
16" - 20"	60	90		150
21-1/2" - 24-1/2"		100		

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METRIC

Rated Capacity On Elevators And Spiders

BJ Type LYT Elevators	18000 daN
BJ Type MYT Elevators	36000 daN
BJ Type YT Tubing Elevators	67000 daN
BJ Type YC Casing Elevators	67000 daN
7-3/4 (193.7mm) BJ Slip Grip Casing Elevators	133000 daN
10-3/4 (273.0mm) BJ Slip Grip Casing Elevators	178000 daN
13-3/8 (339.7mm) BJ Slip Grip Casing Elevators	178000 daN
10-3/4 (273.0mm) BJ Slip Grip Casing Elevators and/or Spiders	445000 daN
13-3/8 (339.7mm) BJ Casing Spiders	356000 daN
13-3/8 (339.7mm) BJ Slip Grip Casing Elevators and/or Spiders	311000 daN

"A" Series Elevators - Capacities in Decanewtons

Size	"AA"	"MAA"	"RA"
2-3/4		156000	111000
2-7/8		156000	111000
3-1/2	222000	156000	111000
4 & 4-1/2 (Reg. & F.H.)	245000	200000	133000
5 5-1/2 & 4-1/2 (IF)	267000	222000	156000
6-5/8	267000	222000	156000
7	267000	222000	156000

Size	"SLA 100"	"SLA 65"	"SLA 35"
1.050			31000
1.315			31000
1.660		58000	31000
1.900		58000	31000
2-3/8	89000	58000	31000
2-7/8	89000	58000	31000
3-1/2	89000	58000	
4	89000	58000	
4-1/2	89000	58000	
5-1/2	89000		
6-5/8	89000		
7	89000		
7-3/8	89000		
8-5/8	89000		

"G" Series Elevators - Capacities in Decanewtons

Size	GG	MGG	RG	MG	LG
2-3/8		156000	133000	89000	36000
2-7/8		156000	133000	89000	36000
3-1/2		156000	133000	89000	
3-1/2 (FH & IF)		178000			
4		200000	156000	89000	
4-1/2 (Reg & FH)		200000	156000	89000	
5 & 4-1/2 (IF)	311000 & 445000		178000	89000	
5-1/2	311000 & 445000		178000		

BJ Type "X" Side Door Elevators Capacities in Decanewtons

Size	Light Weight	Extra Heavy (XH)	Dbl. Extra Heavy (XXH)	Triple Extra Heavy (XXXH)	"SX" Series
1.660 & 1.900		31000			
2-3/8 - 2-7/8		31000	53000		
3-1/2		31000	67000		
4 & 4-1/2 (Reg & FH)	27000	44000	80000		
5,5-1/2 & 4-1/2 (IF)	31000	53000	89000		
6-5/8 & 7	44000	67000	111000		
7-3/8 & 8-5/8	53000	80000	111000	133000	
9-5/8	53000	80000	111000	133000	
10-3/4	53000	80000	111000	133000	578000
11-3/4	53000	80000	111000	133000	
13-3/8	53000	67000	111000	133000	445000
16	53000	80000		133000	445000
18-5/8	53000	80000		178000	
20	53000	80000		178000	222000
21-1/2		89000			
24-1/2		89000			

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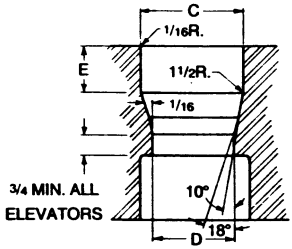
BAASH-ROSS 18° ELEVATOR BORE CHART



Drill Pipe Size		Neck Dia.	C Top Bore	D Center Bore	E T-100	E T-150	E T-250 & T-350
2-3/8	IF	2-9/16	4-1/4	2-21/32	-	-	-
2-7/8	R & FH	3	4-3/8	3-3/32	-	1-5/8	-
	IF	3-3/16	4-3/4	3-9/32	-	1-5/8	-
3-1/2	R & FH	3-11/16	5-1/4	3-25/32	-	1-5/8	-
	IF	3-7/8	5-1/2	3-31/32	-	1-5/8	-
4	FH	4-3/16	6-1/2	4-9/32	1-1/2	1-5/8	3-3/8
	IF	4-1/2	6-3/4	4-25/32	1-1/2	1-5/8	3-3/8
4-1/2	R & FH	4-11/16	6-3/4	4-25/32	1-1/2	1-5/8	3-3/8
	IF	5	7-1/8	5-1/4	1-1/2	1-5/8	3-3/8
5	EIU	5-1/8	7-1/8	5-1/4	1-1/2	1-5/8	3-3/8
5-1/2	R & FH	5-11/16	7-7/8	5-13/16	-	1-5/8	3-3/8

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WEB WILSON ELEVATOR LINKS

MAGNAWELD LINKS **

MAGNAWELD links are available for lightweight tubing service. The inexpensive MAGNAWELD links are made of quality alloy steel which is electrically welded and “magnafluxed-inspected” to help eliminate any flaws or defects. MAGNAWELD links have rated capacities ranging from 50 tons per set of two to 100 tons.

Magnaweld Links

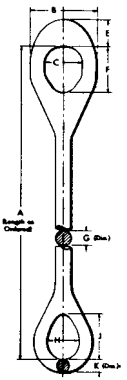
MAGNAWELD ELEVATOR LINKS

Part Number	Size	Rated Capacity Per Set (2) In Tons	Weight Per Set/Lbs.
8548-5015	1-1/4’’ x 24’’*	50	40
8548-5016	1-1/4’’ x 30’’	50	50
8548-5017	1-1/2’’ x 36’’	60	80
8548-5018	1-3/4’’ x 30’’*	80	90
8548-5019	1-3/4’’ x 36’’	80	110
8548-5020	1-3/4’’ x 48’’*	80	148
8548-5021	1-3/4’’ x 60’’*	80	178
8548-5025	1-3/4’’ x 84’’	80	210
8548-5022	2’’ x 42’’	100	176

**Links Come Only as Matched Pairs (2)

PRINCIPAL DIMENSIONS - FORGED LINKS

Link Size	1-3/4’’	2-1/4’’	2-3/4’’	3-1/2’’
Dimension	(In Inches)			
A	Length as ordered			
B	8-1/2	14	14	17
C	5	8	8	9-1/2
E	3-1/2	5	5	6
F	13	10	10	12
G	2-3/8	3	3-9/16	4-1/2
H	4	5-1/2	5-1/2	6-3/4
J	5-1/2	8	8	9-1/2
K	1-3/4	2-1/4	2-3/4	3-1/2



Front View Forged Link

Profile of Forged Link

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FORGED ELEVATOR LINKS**

Forged links from a single billet of high-quality alloy steel and carefully normalized and heat-treated to withstand the streeses and shock of heavy service in deep drilling. The rated API capacities are based on API Safety Factors for such hoisting equipment.

PART NUMBER	NOMINAL SIZE K A	RATED CAPACITY PER SET (2) IN TONS	WT., LBS PER SET (2)
8548-5000	1-3/4" x 36"	150	132
8548-5001	1-3/4" x 48"	150	150
8548-5002	1-3/4" x 60"	150	180
8548-5003	1-3/4" x 72"	150	200
8548-5004	2-1/4" x 72"	250	470
8548-5005	2-1/4" x 84"	250	506
8548-5006	2-1/4" x 96"	250	558
8548-5007	2-1/4" x 108"	250	620
8548-5008	3-3/4" x 72"	350	570
8548-5009	2-3/4" x 84"	350	630
8548-5010	2-3/4" x 96"	350	692
8548-5011	2-3/4" x 108"	350	756
8548-5024	2-3/4" x 120"	350	821
8548-5012	2-3/4" x 132"	350	886
8548-5013	3-1/2" x 132"	500	1416
8548-5014	3-1/2" x 144"	500	1524

* Manufactured on Special Order Only.

** Links Come Only as Matched Pairs (2).

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SECTION 7
DRILL PIPE

	Page
API Drill Pipe Requirements	1
Drill Pipe Dimensional Data	2-3
Drill Pipe Performance Data (New, Premium & Class 2)	4-9
New Drill Pipe & Tool Joints Mechanical Properties	10-30
Premium Drill Pipe & Tool Joints Mechanical Properties	31-52
Class 2 Drill Pipe & Tool Joints Mechanical Properties	53-64
Grant Prideco High Torque (HT) / Extreme Torque (XT) Drill Pipe Tool Joint Properties	65-72
Grant Prideco Special Grade V-150 Drill Pipe Properties	73
Small Diameter Work String Data	74-75
Heavy Weight Drill Pipe (HWDP) Dimensional / Mechanical Properties	76-78
Grant Prideco Spiral-Wate Pipe Properties	79-81
Mill Slot & Groove Method of Drill Pipe Identification	82-85
Classification of Used Drill Pipe	86
Drill Pipe & Tool Joint Color Code Identification	87

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API DRILL PIPE REQUIREMENTS

TENSILE REQUIREMENTS

Grade	Yield Strength				Tensile Strength	
	Minimum		Maximum		Minimum	
	PSI	MPa	PSI	MPa	PSI	MPa
D-55	55,000	379	-	-	95,000	655
E-75	75,000	517	105,000	724	100,000	689
X-95	95,000	655	125,000	862	105,000	724
G-105	105,000	724	135,000	931	115,000	793
S-135	135,000	931	165,000	1138	145,000	1,000

Range Lengths

	Range 1	Range 2	Range 3
	ft. **m**	ft. **m**	ft. **m**
Total Range Length, Inc.	18-22 **5.49-6.71**	27-30 **8.23-9.14**	38-45 **11.58-13.72**
Range Length for 95% or more of Carload:			
Permissible Length Min.	20 6.10	-	-
Permissible Length Max.	2 **0.61**	-	-
Range Length for 90% or more of Carload:			
Permissible Length Min.	-	27 **8.23**	38 **11.58**
Permissible Length Max.	-	2 **0.61**	3 **0.91**

TOLERANCES

Drill Pipe Size		Dimension	Tolerance	
in	**mm**		in	**mm**
2.375-3.500	**60.3-88.9**	O.D.*	+3/32"-1/32"	**+2.38-0.79**
4.000-5.000	**101.6-127.0**		+7/64"-0.75% D	**+2.78-0.75% D**
5.500-6.625	**139.7-168.3**		+1/8"-0.75% D	**+3.18-0.75%**
All Sizes		Wall Thickness	12.50%	
		I.D.	Governed by O.D.& WT Tolerances	
		Eccentricity: O.D.	.093" **2.36 mm** Max (Total Indicator Reading)	
		Eccentricity: I.D.	1/16" **1.59 mm** (1/8" 3.18 mm Total Indicator Reading)	
		Ovality (On Upset)	0.093" **2.36 mm** Maximum	

* Measurements made immediately behind the upset for a distance of approximately 5 inches for sizes 5 1/2" O.D. and smaller, and a distance approximately equal to the O.D. for sizes larger than 5 1/2".

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DRILL PIPE DIMENSIONAL DATA

NEW DRILL PIPE									PREMIMUM CLASS (USED)			CLASS 2 (USED)		
Size O.D.	Nom. Wt. T & C	Plain End Wt.	Wall Thk.	I.D.	Section Area	Polar Sec. Modulus	Tube Capacity Without Tool Joint	Tube Disp. Without Tool Joint	O.D. With	Min. Wall Thk. (80%)	Reduced Cross-sec. Area	O.D. With 30%Wall Reduction	Min. Wall Thk. (70%)	Reduced Cross-sec. Area
in **mm**	lb/ft **kg/m**	lb/ft **kg/m**	in **mm**	in **mm**	in^2 **mm^2**	in^3 **mm^3**	U.S. gal/ft **Litre/m**	U.S. gal/ft **Litre/m**	in **mm**	in **mm**	in^2 **mm^2**	in **mm**	in **mm**	in^2 **mm^2**
2 3/8	4.85	4.43	0.190	1.995	1.304	1.321	0.162	0.068	2.299	0.152	1.025	2.261	0.133	0.889
60.33	**7.22**	**6.59**	**4.83**	**50.67**	**841.42**	**21647**	**2.012**	**0.845**	**58.39**	**3.86**	**661.42**	**57.43**	**3.38**	**573.61**
	6.65	6.26	0.280	1.815	1.843	1.733	0.134	0.096	2.263	0.224	1.435	2.207	0.196	1.238
	9.90	**9.32**	**7.11**	**46.10**	**1188.97**	**28399**	**1.664**	**1.192**	**57.48**	**5.69**	**925.74**	**56.06**	**4.98**	**798.90**
2 7/8	6.85	6.16	0.217	2.441	1.812	2.241	0.243	0.094	2.788	0.174	1.426	2.745	0.152	1.237
73.03	**10.19**	**9.17**	**5.51**	**62.00**	**1169.03**	**36723**	**3.018**	**1.167**	**70.82**	**4.42**	**920.00**	**69.72**	**3.86**	**798.32**
	10.40	9.72	0.362	2.151	2.858	3.204	0.189	0.148	2.730	0.290	2.221	2.658	0.253	1.914
	15.48	**14.46**	**9.19**	**54.64**	**1843.80**	**52504**	**2.347**	**1.838**	**69.35**	**7.37**	**1432.58**	**67.51**	**6.43**	**1234.90**
3 1/2	9.50	8.81	0.254	2.992	2.590	3.923	0.365	0.135	3.398	0.203	2.040	3.348	0.178	1.771
88.90	**14.14**	**13.11**	**6.45**	**76.00**	**1671.09**	**64286**	**4.533**	**1.677**	**86.32**	**5.16**	**1315.93**	**85.03**	**4.52**	**1142.32**
	13.30	12.31	0.368	2.764	3.621	5.144	0.312	0.188	3.353	0.294	2.829	3.279	0.258	2.445
	19.79	**18.32**	**9.35**	**70.21**	**2336.06**	**84295**	**3.875**	**2.335**	**85.16**	**7.47**	**1824.96**	**83.29**	**6.55**	**1577.61**
	15.50	14.63	0.449	2.602	4.304	5.847	0.276	0.224	3.320	0.359	3.342	3.231	0.314	2.880
	23.07	**21.77**	**11.40**	**66.09**	**2776.58**	**95815**	**3.428**	**2.782**	**84.34**	**9.12**	**2155.87**	**82.06**	**7.98**	**1857.80**
4	11.85	10.46	0.262	3.476	3.077	5.400	0.493	0.160	3.895	0.210	2.427	3.843	0.183	2.108
101.60	**17.63**	**15.57**	**6.65**	**88.29**	**1984.96**	**88490**	**6.123**	**1.987**	**98.94**	**5.33**	**1565.74**	**97.61**	**4.65**	**1360.26**
	14.00	12.93	0.330	3.340	3.805	6.458	0.455	0.198	3.868	0.264	2.989	3.802	0.231	2.592
	20.83	**19.24**	**8.38**	**84.84**	**2454.70**	**105828**	**5.651**	**2.459**	**98.25**	**6.71**	**1928.45**	**96.57**	**5.87**	**1671.93**
	15.70	14.69	0.380	3.240	4.322	7.157	0.428	0.224	3.848	0.304	3.385	3.772	0.266	2.930
	23.36	**21.86**	**9.65**	**82.30**	**2788.12**	**117282**	**5.315**	**2.782**	**97.74**	**7.72**	**2183.67**	**95.81**	**6.76**	**1890.19**

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DRILL PIPE DIMENSIONAL DATA

NEW DRILL PIPE									PREMIMUM CLASS (USED)			CLASS 2 (USED)		
Size O.D.	**Nom. Wt. T & C**	**Plain End Wt.**	**Wall Thk.**	**I.D.**	**Section Area**	**Polar Sec. Modulus**	**Tube Capacity Without Tool Joint**	**Tube Disp. Without Tool Joint**	**O.D. With 20%Wall Reduction**	**Min. Wall Thk. (80%)**	**Reduced Cross-sec. Area**	**O.D. With 30%Wall Reduction**	**Min. Wall Thk. (70%)**	**Reduced Cross-sec. Area**
in	lb/ft	lb/ft	in	in	in^2	in^3	U.S. gal/ft	U.S. gal/ft	in	in	in^2	in	in	in^2
mm	**kg/m**	**kg/m**	**mm**	**mm**	**mm^2**	**mm^3**	**Litre/m**	**Litre/m**	**mm**	**mm**	**mm^2**	**mm**	**mm**	**mm^2**
4 1/2	13.75	12.24	0.271	3.958	3.600	7.184	0.639	0.187	4.392	0.217	2.843	4.337	0.190	2.472
114.30	**20.46**	**18.22**	**6.88**	**100.53**	**2322.83**	**117725**	**7.936**	**2.322**	**111.55**	**5.51**	**1834.45**	**110.17**	**4.83**	**1594.77**
	16.60	14.98	0.337	3.826	4.407	8.543	0.597	0.229	4.365	0.270	3.469	4.298	0.236	3.010
	24.70	**22.29**	**8.56**	**97.18**	**2843.48**	**139995**	**7.414**	**2.844**	**110.88**	**6.86**	**2238.00**	**109.16**	**5.99**	**1942.13**
	20.00	18.69	0.430	3.640	5.498	10.232	0.541	0.286	4.328	0.344	4.306	4.242	0.301	3.727
	29.76	**27.81**	**10.92**	**92.46**	**3547.15**	**167672**	**6.719**	**3.552**	**109.93**	**8.74**	**2777.74**	**107.75**	**7.65**	**2404.32**
	22.82	21.36	0.500	3.500	6.283	11.345	0.500	0.326	4.300	0.400	4.901	4.200	0.350	4.233
	33.96	**31.79**	**12.70**	**88.90**	**4053.67**	**185911**	**6.210**	**4.049**	**109.22**	**10.16**	**3161.86**	**106.68**	**8.89**	**2731.16**
5	16.25	14.87	0.296	4.408	4.374	9.718	0.793	0.227	4.882	0.237	3.455	4.822	0.207	3.004
127.00	**24.18**	**22.13**	**7.52**	**111.96**	**2822.12**	**159249**	**9.849**	**2.819**	**123.99**	**6.02**	**2229.29**	**122.49**	**5.26**	**1938.19**
	19.50	17.93	0.362	4.276	5.275	11.415	0.746	0.274	4.855	0.290	4.154	4.783	0.253	3.606
	29.02	**26.68**	**9.19**	**108.61**	**3402.96**	**187058**	**9.265**	**3.403**	**123.32**	**7.37**	**2679.87**	**121.48**	**6.43**	**2326.32**
	25.60	24.03	0.500	4.000	7.069	14.491	0.653	0.367	4.800	0.400	5.529	4.700	0.350	4.783
	38.10	**35.76**	**12.70**	**101.60**	**4560.38**	**237465**	**8.110**	**4.558**	**121.92**	**10.16**	**3567.22**	**119.38**	**8.89**	**3085.86**
5 1/2	19.20	16.87	0.304	4.892	4.962	12.221	0.976	0.258	5.378	0.243	3.924	5.318	0.213	3.413
139.70	**28.57**	**25.11**	**7.72**	**124.26**	**3201.54**	**200266**	**12.121**	**3.204**	**136.61**	**6.17**	**2531.29**	**135.07**	**5.41**	**2201.74**
	21.90	19.81	0.361	4.778	5.828	14.062	0.931	0.303	5.356	0.289	4.597	5.283	0.253	3.994
	32.59	**29.48**	**9.17**	**121.36**	**3760.12**	**230435**	**11.562**	**3.763**	**136.03**	**7.34**	**2965.87**	**134.20**	**6.43**	**2576.64**
	24.70	22.54	0.415	4.670	6.630	15.688	0.890	0.344	5.334	0.332	5.217	5.251	0.290	4.527
	36.76	**33.54**	**10.54**	**118.62**	**4277.15**	**257080**	**11.053**	**4.272**	**135.48**	**8.43**	**3365.86**	**133.38**	**7.37**	**2920.70**
6 5/8	25.20	22.19	0.330	5.965	6.526	19.572	1.452	0.339	6.493	0.264	5.166	6.427	0.231	4.497
168.28	**37.50**	**33.02**	**8.38**	**151.51**	**4210.44**	**320728**	**18.033**	**4.210**	**164.92**	**6.71**	**3333.03**	**163.25**	**5.87**	**2900.96**
	27.70	24.22	0.362	5.901	7.123	21.156	1.421	0.370	6.480	0.290	5.632	6.408	0.253	4.899
	41.22	**36.04**	**9.19**	**149.89**	**4595.28**	**346685**	**17.648**	**4.595**	**164.60**	**7.37**	**3633.73**	**162.76**	**6.43**	**3160.90**

REFERENCE: RP7G 16th Edition, August 1998; Table 1 & 26

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API NEW DRILL PIPE PERFORMANCE DATA

Size O.D.	Nom. Wt. T & C	Torsional Data Torsional Yield Strength				Tensile Data Based on Minimum Values Load at the Minimum Yield Strength				Collapse Pressure Based on Minimum Values				Internal Pressure at Minimum Yield Strength			
		E75	X95	G105	S135	E75	X95	G105	S135	E75	X95	G105	S135	E75	X95	G105	S135
in	lb/ft	ft.lb	ft.lb	ft.lb	ft.lb	lb	lb	lb	lb	psi	psi	psi	psi	psi	psi	psi	psi
mm	**kg/m**	**N.m**	**N.m**	**N.m**	**N.m**	**daN**	**daN**	**daN**	**daN**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**
2 3/8	4.85	4,700	6,000	6,600	8,500	97,800	123,900	136,900	176,000	11,000	13,900	15,400	19,000	10,500	13,300	14,700	18,900
60.33	**7.22**	**6,400**	**8,100**	**9,000**	**11,600**	**43,500**	**55,100**	**60,900**	**78,300**	**76,100**	**96,400**	**106,500**	**131,200**	**72,300**	**91,700**	**101,300**	**130,300**
	6.65	6,200	7,900	8,700	11,200	138,200	175,000	193,500	248,700	15,500	19,700	21,800	28,000	15,400	19,600	21,600	27,800
	9.90	**8,400**	**10,700**	**11,800**	**15,200**	**61,400**	**77,800**	**86,000**	**110,600**	**107,500**	**136,200**	**150,500**	**193,500**	**106,600**	**135,100**	**149,300**	**192,000**
2 7/8	6.85	8,000	10,200	11,300	14,500	135,900	172,100	190,200	244,600	10,400	12,900	14,000	17,000	9,900	12,500	13,800	17,800
73.03	**10.19**	**10,900**	**13,800**	**15,300**	**19,700**	**60,400**	**76,500**	**84,600**	**108,800**	**72,100**	**89,200**	**96,600**	**117,400**	**68,300**	**86,500**	**95,600**	**122,900**
	10.40	11,500	14,600	16,100	20,700	214,300	271,500	300,000	385,800	16,500	20,900	23,100	29,700	16,500	20,900	23,100	29,700
	15.48	**15,600**	**19,800**	**21,900**	**28,100**	**95,300**	**120,700**	**133,400**	**171,600**	**113,800**	**144,100**	**159,300**	**204,800**	**113,900**	**144,300**	**159,500**	**205,000**
3 1/2	9.50	14,100	17,900	19,800	25,400	194,200	246,000	271,900	349,600	10,000	12,000	13,000	15,700	9,500	12,000	13,300	17,100
88.90	**14.14**	**19,100**	**24,200**	**26,800**	**34,500**	**86,400**	**109,400**	**120,900**	**155,500**	**68,900**	**83,200**	**90,000**	**108,500**	**65,600**	**83,100**	**91,900**	**118,200**
	13.30	18,500	23,400	25,900	33,300	271,500	343,900	380,100	488,800	14,100	17,800	19,700	25,400	13,800	17,400	19,300	24,800
	19.79	**25,100**	**31,800**	**35,200**	**45,200**	**120,700**	**153,000**	**169,100**	**217,400**	**97,300**	**123,200**	**136,200**	**175,100**	**95,100**	**120,500**	**133,200**	**171,200**
	15.50	21,000	26,700	29,500	37,900	322,700	408,800	451,800	580,900	16,700	21,200	23,400	30,100	16,800	21,300	23,500	30,300
	23.07	**28,500**	**36,200**	**40,000**	**51,400**	**143,500**	**181,800**	**201,000**	**258,400**	**115,600**	**146,400**	**161,900**	**208,100**	**116,000**	**147,000**	**162,500**	**208,900**
4	11.85	19,400	24,600	27,200	35,000	230,700	292,200	323,000	415,300	8,300	9,900	10,700	12,600	8,500	10,800	12,000	15,400
101.60	**17.63**	**26,400**	**33,400**	**36,900**	**47,500**	**102,600**	**130,000**	**143,700**	**184,700**	**57,700**	**68,700**	**73,800**	**86,900**	**59,200**	**75,000**	**82,900**	**106,600**
	14.00	23,200	29,400	32,600	41,900	285,300	361,400	399,500	513,600	11,300	14,300	15,800	20,100	10,800	13,700	15,100	19,400
	20.83	**31,500**	**39,900**	**44,200**	**56,800**	**126,900**	**160,700**	**177,700**	**228,400**	**78,200**	**99,100**	**109,500**	**138,800**	**74,600**	**94,500**	**104,500**	**134,300**
	15.70	25,800	32,600	36,100	46,400	324,100	410,500	453,700	583,400	12,800	16,300	18,000	23,200	12,400	15,700	17,400	22,400
	23.36	**34,900**	**44,300**	**48,900**	**62,900**	**144,100**	**182,600**	**201,800**	**259,500**	**88,900**	**112,600**	**124,400**	**160,000**	**85,900**	**108,800**	**120,300**	**154,700**

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API NEW DRILL PIPE PERFORMANCE DATA

Size O.D.	Nom. Wt. T & C	Torsional Data Torsional Yield Strength				Tensile Data Based on Minimum Values Load at the Minimum Yield Strength				Collapse Pressure Based on Minimum Values				Internal Pressure at Minimum Yield Strength			
		E75	X95	G105	S135	E75	X95	G105	S135	E75	X95	G105	S135	E75	X95	G105	S135
in	lb/ft	ft.lb	ft.lb	ft.lb	ft.lb	lb	lb	lb	lb	psi	psi	psi	psi	psi	psi	psi	psi
mm	**kg/m**	**N.m**	**N.m**	**N.m**	**N.m**	**daN**	**daN**	**daN**	**daN**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**
4 1/2	13.75	25,900	32,800	36,200	46,600	270,000	342,000	378,000	486,000	7,100	8,400	8,900	10,200	7,900	10,000	11,000	14,200
114.30	**20.46**	**35,100**	**44,400**	**49,100**	**63,200**	**120,100**	**152,100**	**168,100**	**216,200**	**49,400**	**57,900**	**61,700**	**70,800**	**54,400**	**69,000**	**76,200**	**98,000**
	16.60	30,800	39,000	43,100	55,400	330,500	418,700	462,700	595,000	10,300	12,700	13,800	16,700	9,800	12,400	13,700	17,600
	24.70	**41,700**	**52,900**	**58,400**	**75,100**	**147,000**	**186,200**	**205,800**	**264,600**	**71,600**	**88,000**	**95,300**	**115,600**	**67,700**	**85,800**	**94,800**	**121,900**
	20.00	36,900	46,700	51,600	66,400	412,300	522,300	577,300	742,200	12,900	16,400	18,100	23,300	12,500	15,800	17,500	22,500
	29.76	**50,000**	**63,300**	**70,000**	**90,000**	**183,400**	**232,300**	**256,700**	**330,100**	**89,300**	**113,200**	**125,100**	**160,800**	**86,400**	**109,500**	**121,000**	**155,600**
	22.82	40,900	51,800	57,200	73,600	471,200	596,900	659,700	848,200	14,800	18,700	20,700	26,600	14,500	18,400	20,400	26,200
	33.96	**55,400**	**70,200**	**77,600**	**99,800**	**209,600**	**265,500**	**293,400**	**377,300**	**102,100**	**129,300**	**143,000**	**183,800**	**100,500**	**127,300**	**140,700**	**180,900**
5	16.25	35,000	44,300	49,000	63,000	328,000	415,500	459,300	590,500	6,900	8,100	8,600	9,800	7,700	9,800	10,800	13,900
127.00	**24.18**	**47,500**	**60,100**	**66,500**	**85,500**	**145,900**	**184,800**	**204,300**	**262,600**	**47,800**	**55,900**	**59,400**	**67,700**	**53,500**	**67,800**	**75,000**	**96,400**
	19.50	41,100	52,100	57,600	74,100	395,500	501,000	553,800	712,000	9,900	12,000	12,900	15,600	9,500	12,000	13,300	17,100
	29.02	**55,800**	**70,600**	**78,100**	**100,400**	**175,900**	**222,800**	**246,300**	**316,700**	**68,600**	**82,900**	**89,600**	**108,000**	**65,500**	**82,900**	**91,700**	**117,900**
	25.60	52,200	66,100	73,100	94,000	530,100	671,500	742,200	954,200	13,500	17,100	18,900	24,300	13,100	16,600	18,300	23,600
	38.10	**70,800**	**89,700**	**99,100**	**127,500**	**235,800**	**298,700**	**330,100**	**424,400**	**93,000**	**117,900**	**130,300**	**167,500**	**90,400**	**114,600**	**126,600**	**162,800**
5 1/2	19.20	44,000	55,800	61,700	79,300	372,100	471,400	521,000	669,900	6,000	6,900	7,300	8,000	7,200	9,100	10,100	13,000
139.70	**28.57**	**59,700**	**75,600**	**83,600**	**107,500**	**165,500**	**209,700**	**231,700**	**297,900**	**41,600**	**47,800**	**50,400**	**55,700**	**50,000**	**63,300**	**70,000**	**90,000**
	21.90	50,700	64,200	70,900	91,200	437,100	553,600	611,900	786,800	8,400	10,000	10,700	12,600	8,600	10,900	12,000	15,500
	32.59	**68,700**	**87,000**	**96,200**	**123,700**	**194,400**	**246,200**	**272,200**	**349,900**	**58,000**	**69,000**	**74,100**	**87,400**	**59,300**	**75,200**	**83,100**	**106,900**
	24.70	56,500	71,600	79,200	101,800	497,200	629,800	696,100	894,900	10,400	12,900	14,000	17,000	9,900	12,500	13,800	17,800
	36.76	**76,700**	**97,100**	**107,300**	**138,000**	**221,100**	**280,100**	**309,600**	**398,100**	**72,100**	**89,100**	**96,600**	**117,300**	**68,200**	**86,400**	**95,500**	**122,900**
6 5/8	25.20	70,500	89,400	98,800	127,000	489,400	619,900	685,200	881,000	4,700	5,300	5,500	6,000	6,500	8,200	9,100	11,700
168.28	**37.50**	**95,600**	**121,200**	**133,900**	**172,200**	**217,700**	**275,700**	**304,800**	**391,900**	**33,000**	**36,600**	**37,900**	**41,600**	**45,000**	**57,000**	**63,100**	**81,100**
	27.70	76,200	96,600	106,800	137,300	534,100	676,600	747,800	961,500	5,800	6,700	7,100	7,800	7,100	9,000	10,000	12,900
	41.22	**103,400**	**131,000**	**144,800**	**186,100**	**237,600**	**300,900**	**332,600**	**427,700**	**40,600**	**46,500**	**48,900**	**53,800**	**49,400**	**62,600**	**69,200**	**89,000**

REFERENCE: RP7G 16th Edition, August 1998; Table 2 & 3

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API PREMIUM CLASS DRILL PIPE PERFORMANCE DATA

Size O.D.	Nom. Wt. T&C	Torsional Yield Strength Based on Uniform Wear				Tensile Data Based on Uniform Wear. Load at the Minimum Yield Strength				Collapse Pressure Based on Minimum Values				Minimum Internal Yield Pressure at Minimum Yield Strength			
		E75	X95	G105	S135	E75	X95	G105	S135	E75	X95	G105	S135	E75	X95	G105	S135
in	lb/ft	ft.lb	ft.lb	ft.lb	ft.lb	lb	lb	lb	lb	psi	psi	psi	psi	psi	psi	psi	psi
mm	**kg/m**	**N.m**	**N.m**	**N.m**	**N.m**	**daN**	**daN**	**daN**	**daN**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**
2 3/8	4.85	3,700	4,700	5,200	6,700	76,800	97,300	107,600	138,400	8,500	10,100	10,900	12,800	9,600	12,100	13,400	17,200
60.33	**7.22**	**5,000**	**6,300**	**7,000**	**9,000**	**34,200**	**43,300**	**47,800**	**61,500**	**58,700**	**70,000**	**75,200**	**88,800**	**66,100**	**83,800**	**92,600**	**119,100**
	6.65	4,800	6,000	6,700	8,600	107,600	136,300	150,600	193,700	13,300	16,900	18,700	24,000	14,100	17,900	19,800	25,400
	9.90	**6,500**	**8,200**	**9,100**	**11,700**	**47,800**	**60,600**	**67,000**	**86,100**	**92,200**	**116,800**	**129,100**	**166,000**	**97,500**	**123,500**	**136,500**	**175,500**
2 7/8	6.85	6,300	8,000	8,800	11,300	106,900	135,400	149,700	192,500	7,600	9,000	9,600	11,100	9,000	11,400	12,600	16,300
73.03	**10.19**	**8,500**	**10,800**	**12,000**	**15,400**	**47,500**	**60,200**	**66,600**	**85,600**	**52,600**	**62,100**	**66,400**	**77,100**	**62,400**	**79,100**	**87,400**	**112,400**
	10.40	8,800	11,200	12,400	15,900	166,500	210,900	233,100	299,700	14,200	18,000	19,900	25,600	15,100	19,100	21,100	27,100
	15.48	**12,000**	**15,200**	**16,800**	**21,600**	**74,000**	**93,800**	**103,700**	**133,300**	**98,000**	**124,200**	**137,200**	**176,500**	**104,100**	**131,900**	**145,800**	**187,500**
3 1/2	9.50	11,000	14,000	15,500	19,900	152,900	193,700	214,100	275,300	7,000	8,200	8,800	10,000	8,700	11,000	12,100	15,600
88.90	**14.14**	**15,000**	**19,000**	**21,000**	**27,000**	**68,000**	**86,100**	**95,200**	**122,400**	**48,700**	**57,100**	**60,700**	**69,500**	**60,000**	**76,000**	**84,000**	**108,000**
	13.30	14,300	18,100	20,100	25,800	212,100	268,700	297,000	381,800	12,000	15,200	16,800	21,600	12,600	15,900	17,600	22,700
	19.79	**19,400**	**24,600**	**27,200**	**35,000**	**94,300**	**119,500**	**132,100**	**169,800**	**82,800**	**104,900**	**115,900**	**149,100**	**86,900**	**110,100**	**121,700**	**156,500**
	15.50	16,100	20,400	22,600	29,000	250,600	317,400	350,800	451,100	14,400	18,300	20,200	26,000	15,300	19,400	21,500	27,700
	23.07	**21,800**	**27,700**	**30,600**	**39,400**	**111,400**	**141,200**	**156,000**	**200,600**	**99,700**	**126,300**	**139,600**	**179,600**	**106,100**	**134,400**	**148,500**	**191,000**
4	11.85	15,300	19,300	21,400	27,500	182,000	230,500	254,800	327,600	5,700	6,500	6,800	7,400	7,800	9,900	11,000	14,100
101.60	**17.63**	**20,700**	**26,200**	**29,000**	**37,300**	**80,900**	**102,500**	**113,300**	**145,700**	**39,300**	**44,800**	**47,000**	**51,300**	**54,100**	**68,600**	**75,800**	**97,500**
	14.00	18,100	23,000	25,400	32,700	224,100	283,900	313,800	403,500	9,000	10,700	11,600	13,800	9,900	12,500	13,800	17,800
	20.83	**24,600**	**31,200**	**34,500**	**44,400**	**99,700**	**126,300**	**139,600**	**179,400**	**62,100**	**74,400**	**80,100**	**95,300**	**68,200**	**86,400**	**95,500**	**122,800**
	15.70	20,000	25,400	28,000	36,100	253,800	321,500	355,300	456,900	10,900	13,800	15,100	18,500	11,400	14,400	15,900	20,500
	23.36	**27,200**	**34,400**	**38,000**	**48,900**	**112,900**	**143,000**	**158,000**	**203,200**	**75,200**	**95,300**	**104,700**	**128,100**	**78,600**	**99,500**	**110,000**	**141,400**
4 1/2	13.75	20,400	25,800	28,500	36,700	213,200	270,100	298,500	383,800	4,600	5,100	5,300	5,900	7,200	9,100	10,100	13,000
114.30	**20.46**	**27,600**	**35,000**	**38,700**	**49,700**	**94,800**	**120,100**	**132,800**	**170,700**	**32,300**	**35,700**	**36,900**	**40,700**	**49,800**	**63,100**	**69,700**	**89,600**
	16.60	24,100	30,500	33,700	43,400	260,100	329,500	364,200	468,200	7,500	8,800	9,400	10,900	8,900	11,300	12,500	16,100
	24.70	**32,700**	**41,400**	**45,800**	**58,900**	**115,700**	**146,500**	**162,000**	**208,300**	**51,800**	**61,100**	**65,200**	**75,500**	**61,900**	**78,400**	**86,700**	**111,500**

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API PREMIUM CLASS DRILL PIPE PERFORMANCE DATA

Size O.D.	Nom. Wt. T&C	Torsional Yield Strength Based on Uniform Wear				Tensile Data Based on Uniform Wear. Load at the Minimum Yield Strength				Collapse Pressure Based on Minimum Values				Minimum Internal Yield Pressure at Minimum Yield Strength			
		E75	X95	G105	S135	E75	X95	G105	S135	E75	X95	G105	S135	E75	X95	G105	S135
in	lb/ft	ft.lb	ft.lb	ft.lb	ft.lb	lb	lb	lb	lb	psi	psi	psi	psi	psi	psi	psi	psi
mm	**kg/m**	**N.m**	**N.m**	**N.m**	**N.m**	**daN**	**daN**	**daN**	**daN**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**
4 1/2	20.00	28,600	36,300	40,100	51,600	322,900	409,000	452,000	581,200	10,900	13,900	15,300	18,800	11,400	14,500	16,000	20,600
114.30	**29.76**	**38,800**	**49,200**	**54,400**	**70,000**	**143,600**	**181,900**	**201,000**	**258,500**	**75,600**	**95,800**	**105,800**	**129,600**	**79,000**	**100,100**	**110,600**	**142,300**
	22.82	31,500	40,000	44,200	56,800	367,500	465,500	514,500	661,600	12,600	16,000	17,700	22,700	13,300	16,800	18,600	24,000
	33.96	**42,800**	**54,200**	**59,900**	**77,000**	**163,500**	**207,100**	**228,900**	**294,300**	**87,200**	**110,500**	**122,100**	**157,000**	**91,900**	**116,400**	**128,700**	**165,400**
5	16.25	27,600	34,900	38,600	49,600	259,100	328,200	362,800	466,400	4,400	4,900	5,000	5,600	7,100	8,900	9,900	12,700
127.00	**24.18**	**37,400**	**47,400**	**52,400**	**67,300**	**115,200**	**146,000**	**161,300**	**207,500**	**30,900**	**34,000**	**34,900**	**39,000**	**48,900**	**62,000**	**68,500**	**88,100**
	19.50	32,200	40,800	45,100	58,100	311,500	394,600	436,100	560,700	7,000	8,200	8,700	10,000	8,600	11,000	12,100	15,600
	29.02	**43,700**	**55,400**	**61,200**	**78,700**	**138,500**	**175,500**	**194,000**	**249,400**	**48,500**	**56,800**	**60,400**	**69,100**	**59,900**	**75,800**	**83,800**	**107,800**
	25.60	40,500	51,300	56,700	72,900	414,600	525,200	580,500	746,400	11,400	14,500	16,000	20,500	12,000	15,200	16,800	21,600
	38.10	**54,900**	**69,600**	**76,900**	**98,900**	**184,400**	**233,600**	**258,200**	**332,000**	**79,000**	**100,000**	**110,600**	**141,400**	**82,700**	**104,800**	**115,800**	**148,900**
5 1/2	19.20	34,700	44,000	48,600	62,500	294,200	372,700	411,900	529,600	3,700	4,100	4,300	4,700	6,600	8,400	9,200	11,900
139.70	**28.57**	**47,100**	**59,700**	**65,900**	**84,800**	**130,800**	**165,700**	**183,200**	**235,600**	**25,700**	**28,400**	**29,800**	**32,500**	**45,700**	**57,900**	**64,000**	**82,300**
	21.90	39,800	50,400	55,800	71,700	344,700	436,700	482,600	620,600	5,700	6,500	6,800	7,400	7,800	9,900	11,000	14,100
	32.59	**54,000**	**68,400**	**75,600**	**97,200**	**153,300**	**194,200**	**214,700**	**276,000**	**39,500**	**45,100**	**47,300**	**51,600**	**54,300**	**68,700**	**76,000**	**97,700**
	24.70	44,300	56,100	62,000	79,700	391,200	495,600	547,700	704,300	7,600	9,000	9,600	11,100	9,000	11,400	12,600	16,200
	36.76	**60,000**	**76,100**	**84,100**	**108,100**	**174,000**	**220,400**	**243,600**	**313,200**	**52,600**	**62,100**	**66,300**	**77,000**	**62,400**	**79,000**	**87,300**	**112,300**
6 5/8	25.20	55,700	71,500	79,000	101,600	387,400	490,700	542,400	697,400	2,900	3,200	3,300	3,400	5,900	7,500	8,300	10,700
168.28	**37.50**	**75,600**	**96,900**	**107,100**	**137,700**	**172,300**	**218,300**	**241,200**	**310,200**	**20,200**	**22,400**	**23,100**	**23,600**	**41,200**	**52,200**	**57,600**	**74,100**
	27.70	60,100	77,300	85,400	109,800	422,400	535,000	591,300	760,300	3,600	4,000	4,200	4,500	6,500	8,300	9,100	11,800
	41.22	**81,600**	**104,800**	**115,800**	**148,900**	**187,900**	**238,000**	**263,000**	**338,200**	**24,900**	**27,700**	**29,100**	**31,400**	**45,200**	**57,200**	**63,200**	**81,300**

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API CLASS 2 DRILL PIPE PERFORMANCE DATA

Size O.D.	Nom. Wt. T & C	Torsional Yield Strength Based on Uniform Wear				Tensile Data Based on Uniform Wear. Load at the Minimum Yield Strength				Collapse Pressure Based on Minimum Values				Internal Pressure at Minimum Yield Strength			
		E75	X95	G105	S135	E75	X95	G105	S135	E75	X95	G105	S135	E75	X95	G105	S135
in	lb/ft	ft.lb	ft.lb	ft.lb	ft.lb	lb	lb	lb	lb	psi	psi	psi	psi	psi	psi	psi	psi
mm	**kg/m**	**N.m**	**N.m**	**N.m**	**N.m**	**daN**	**daN**	**daN**	**daN**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**
2 3/8	4.85	3200	4000	4500	5800	66600	84400	93300	120000	6800	7900	8400	9600	8400	10600	11700	15100
60.33	**7.22**	**4300**	**5500**	**6100**	**7800**	**29600**	**37500**	**41500**	**53300**	**47200**	**55100**	**58500**	**66600**	**57900**	**73300**	**81000**	**104200**
	6.65	4100	5200	5700	7400	92800	117600	130000	167100	12100	15300	16900	21800	12300	15600	17300	22200
	9.90	**5500**	**7000**	**7800**	**10000**	**41300**	**52300**	**57800**	**74300**	**83600**	**106000**	**117100**	**150600**	**85300**	**108100**	**119400**	**153600**
2 7/8	6.85	5400	6900	7600	9800	92800	117500	129900	167000	6000	6900	7300	8100	7900	10000	11000	14200
73.03	**10.19**	**7400**	**9400**	**10400**	**13300**	**41200**	**52200**	**57700**	**74300**	**41700**	**48000**	**50500**	**56000**	**54600**	**69200**	**76400**	**98300**
	10.40	7500	9600	10600	13600	143500	181800	200900	258400	12900	16300	18100	23200	13200	16700	18500	23700
	15.48	**10200**	**13000**	**14400**	**18500**	**63800**	**80800**	**89400**	**114900**	**89200**	**112900**	**124800**	**160500**	**91100**	**115400**	**127600**	**164000**
3 1/2	9.50	9600	12100	13400	17300	132700	168200	185900	239000	5500	6300	6500	7100	7600	9600	10600	13700
88.90	**14.14**	**13000**	**16500**	**18200**	**23400**	**59000**	**74800**	**82600**	**106300**	**38200**	**43400**	**45400**	**49200**	**52500**	**66500**	**73500**	**94500**
	13.30	12300	15600	17300	22200	183300	232300	256700	330100	10800	13700	15000	18300	11000	13900	15400	19800
	19.79	**16700**	**21200**	**23400**	**30100**	**81500**	**103300**	**114200**	**146800**	**74800**	**94800**	**103700**	**126800**	**76100**	**96400**	**106500**	**137000**
	15.50	13800	17500	19300	24800	215900	273500	302300	388700	13100	16600	18400	23700	13400	17000	18800	24200
	23.07	**18700**	**23700**	**26200**	**33700**	**96000**	**121600**	**134400**	**172900**	**90800**	**115000**	**127100**	**163400**	**92800**	**117600**	**130000**	**167100**
4	11.85	13200	16800	18500	23900	158100	200300	221300	284600	4300	4700	4800	5400	6800	8700	9600	12300
101.60	**17.63**	**18000**	**22800**	**25200**	**32400**	**70300**	**89000**	**98400**	**126600**	**29700**	**32400**	**33600**	**37400**	**47400**	**60000**	**66300**	**85300**
	14.00	15700	19900	22000	28300	194300	246100	272100	349800	7200	8500	9100	10500	8600	10900	12100	15500
	20.83	**21300**	**27000**	**29800**	**38400**	**86400**	**109500**	**121000**	**155600**	**50200**	**59000**	**62900**	**72500**	**59700**	**75600**	**83600**	**107500**
	15.70	17300	21900	24200	31100	219700	278300	307600	395500	9500	11400	12300	14800	9900	12600	13900	17900
	23.36	**23400**	**29700**	**32800**	**42200**	**97700**	**123800**	**136800**	**175900**	**65700**	**79000**	**85300**	**102300**	**68700**	**87100**	**96200**	**123700**
4 1/2	13.75	17700	22400	24800	31800	185300	234800	259500	333700	3300	3800	4000	4200	6300	8000	8800	11300
114.30	**20.46**	**24000**	**30400**	**33600**	**43200**	**82400**	**104400**	**115400**	**148400**	**23400**	**26500**	**27600**	**29500**	**43500**	**55200**	**61000**	**78400**
	16.60	20900	26400	29200	37600	225700	285900	316000	406300	5900	6800	7100	7900	7800	9900	11000	14100
	24.70	**28300**	**35900**	**39600**	**51000**	**100400**	**127200**	**140500**	**180700**	**41000**	**47000**	**49500**	**54600**	**54200**	**68600**	**75900**	**97500**

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API CLASS 2 DRILL PIPE PERFORMANCE DATA

Size O.D.	Nom. Wt. T & C	Torsional Yield Strength Based on Uniform Wear				Tensile Data Based on Uniform Wear. Load at the MinimumYield Strength				Collapse Pressure Based on Minimum Values				Internal Pressure at Minimum Yield Strength			
		E75	X95	G105	S135	E75	X95	G105	S135	E75	X95	G105	S135	E75	X95	G105	S135
in	lb/ft	ft.lb	ft.lb	ft.lb	ft.lb	lb	lb	lb	lb	psi	psi	psi	psi	psi	psi	psi	psi
mm	**kg/m**	**N.m**	**N.m**	**N.m**	**N.m**	**daN**	**daN**	**daN**	**daN**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**	**kPa**
4 1/2	20.00	24700	31300	34600	44500	279500	354000	391300	503100	9600	11500	12500	15000	10000	12700	14000	18000
114.30	**29.76**	**33500**	**42400**	**46900**	**60300**	**124300**	**157400**	**174000**	**223700**	**66400**	**79900**	**86300**	**103600**	**69100**	**87600**	**96800**	**124500**
	22.82	27100	34400	38000	48800	317400	402100	444400	571400	11500	14500	16000	20500	11600	14700	16300	21000
	33.96	**36800**	**46600**	**51500**	**66200**	**141200**	**178800**	**197700**	**254200**	**79600**	**100000**	**110600**	**141400**	**80400**	**101800**	**112600**	**144700**
5	16.25	23900	30300	33500	43100	225300	285400	315400	405500	3200	3600	3800	4000	6200	7800	8700	11100
127.00	**24.18**	**32500**	**41100**	**45500**	**58500**	**100200**	**126900**	**140300**	**180400**	**22500**	**25400**	**26500**	**28000**	**42800**	**54200**	**59900**	**77100**
	19.50	27900	35400	39100	50300	270400	342500	378600	486700	5500	6200	6500	7000	7600	9600	10600	13600
	29.02	**37900**	**48000**	**53100**	**68200**	**120200**	**152300**	**168400**	**216500**	**38000**	**43100**	**45100**	**48800**	**52400**	**66300**	**73300**	**94300**
	25.60	34900	44200	48900	62900	358700	454300	502200	645700	10300	12600	13600	16500	10500	13300	14700	18900
	38.10	**47300**	**60000**	**66300**	**85200**	**159500**	**202100**	**223300**	**287200**	**71200**	**87100**	**94300**	**114300**	**72300**	**91700**	**101300**	**130300**
5 1/2	19.20	30200	38200	42200	54300	255900	324200	358300	460700	2800	3100	3200	3200	5800	7300	8100	10400
139.70	**28.57**	**40900**	**51800**	**57300**	**73700**	**113800**	**144200**	**159300**	**204900**	**19500**	**21500**	**22100**	**22500**	**40000**	**50600**	**56000**	**72000**
	21.90	34500	43800	48400	62200	299500	379400	419300	539100	4300	4700	4800	5400	6800	8700	9600	12400
	32.59	**46800**	**59300**	**65600**	**84300**	**133200**	**168700**	**186500**	**239800**	**29800**	**32600**	**33700**	**37600**	**47500**	**60100**	**66500**	**85500**
	24.70	38300	48600	53700	69000	339500	430000	475300	611100	6000	6900	7300	8100	7900	10000	11000	14200
	36.76	**52000**	**65900**	**72800**	**93600**	**151000**	**191300**	**211400**	**271800**	**41700**	**47900**	**50500**	**55900**	**54600**	**69100**	**76400**	**98300**
6 5/8	25.20	48400	61400	67800	87200	337200	427100	472100	607000	2200	2300	2300	2300	5200	6600	7300	9400
168.28	**37.50**	**65700**	**83200**	**92000**	**118300**	**150000**	**190000**	**210000**	**270000**	**15300**	**16100**	**16100**	**16100**	**36000**	**45600**	**50400**	**64900**
	27.70	52300	66200	73200	94100	367400	465400	514400	661400	2700	3000	3100	3100	5700	7200	8000	10300
	41.22	**70900**	**89800**	**99200**	**127600**	**163400**	**207000**	**228800**	**294200**	**19000**	**20900**	**21400**	**21700**	**39500**	**50100**	**55300**	**71200**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
2 3/8 **60.33**	1.995 **50.67**	4.85 **7.22**	5.26 **7.83**	EU-E75	NC26 (2 3/8 IF)	3 3/8 **85.73**	1 3/4 **44.45**	1.625 **41.28**	97,800 **43,500**	313,600 **139,500**	4,700 **6,400**	6,800 b **9,300**	4,120 **5,590**	0.160 **1.982**	0.088 **1.096**
			5.15 **7.66**	EU-E75	2 3/8 WO	3 3/8 **85.73**	2 **50.80**	1.807 **45.90**	97,800 **43,500**	195,600 **87,000**	4,700 **6,400**	4,300 p **5,800**	2,580 **3,500**	0.162 **2.017**	0.085 **1.060**
			4.95 **7.37**	EU-E75	2 3/8 OHLW	3 1/8 **79.38**	2 **50.80**	1.807 **45.90**	97,800 **43,500**	206,400 **91,800**	4,700 **6,400**	4,500 p **6,100**	2,710 **3,670**	0.162 **2.017**	0.080 **0.998**
			5.05 **7.52**	EU-E75	2 3/8 SL-H90	3 1/4 **82.55**	2 **50.80**	1.850 **46.99**	97,800 **43,500**	202,600 **90,100**	4,700 **6,400**	5,100 p **6,900**	3,070 **4,160**	0.162 **2.017**	0.083 **1.028**
	1.815 **46.10**	6.65 **9.90**	6.71 **9.99**	IU-E75	2 3/8 PAC	2 7/8 **73.03**	1 3/8 **34.93**	1.250 **31.75**	138,200 **61,400**	238,500 **106,000**	6,200 **8,400**	4,600 p **6,300**	2,810 **3,810**	0.130 **1.616**	0.108 **1.343**
			6.99 **10.40**	EU-E75	NC26 (2 3/8 IF)	3 3/8 **85.73**	1 3/4 **44.45**	1.625 **41.28**	138,200 **61,400**	313,600 **139,500**	6,200 **8,400**	6,800 b **9,300**	4,120 **5,590**	0.134 **1.660**	0.114 **1.417**
			6.81 **10.13**	EU-E75	2 3/8 SL-H90	3 1/8 **79.38**	1 3/4 **44.45**	1.625 **41.28**	138,200 **61,400**	291,200 **129,500**	6,200 **8,400**	5,600 b **7,700**	3,400 **4,620**	0.134 **1.660**	0.109 **1.355**
			6.78 **10.09**	EU-E75	2 3/8 SL-H90	3 1/8 **79.38**	1 13/16 **46.04**	1.670 **42.42**	138,200 **61,400**	270,200 **120,200**	6,200 **8,400**	5,600 b **7,700**	3,400 **4,620**	0.134 **1.669**	0.108 **1.347**
			6.78 **10.09**	EU-E75	2 3/8 SL-H90	3 1/4 **82.55**	2 **50.80**	1.670 **42.42**	138,200 **61,400**	202,800 **90,200**	6,200 **8,400**	5,100 p **6,900**	3,070 **4,160**	0.137 **1.696**	0.109 **1.350**
			6.89 **10.25**	EU-E75	2 3/8 OHSW	3 1/4 **82.55**	1 3/4 **44.45**	1.625 **41.28**	138,200 **61,400**	294,600 **131,000**	6,200 **8,400**	6,400 b **8,700**	3,890 **5,270**	0.134 **1.660**	0.112 **1.385**
			7.11 **10.58**	EU-X95	NC26 (2 3/8 IF)	3 3/8 **85.73**	1 3/4 **44.45**	1.625 **41.28**	175,000 **77,800**	313,600 **139,500**	7,900 **10,700**	6,800 b **9,300**	4,120 **5,590**	0.134 **1.660**	0.114 **1.417**
			6.99 **10.40**	EU-X95	2 3/8 SL-H90	3 1/4 **82.55**	1 13/16 **46.04**	1.670 **42.42**	175,000 **77,800**	270,200 **120,200**	7,900 **10,700**	6,800 p **9,300**	4,130 **5,600**	0.134 **1.669**	0.111 **1.377**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
2 3/8	1.815	6.65	7.11	EU-G105	NC26 (2 3/8 IF)	3 3/8	1 3/4	1.625	193,500	313,600	8,700	6,800 b	4,120	0.134	0.114
60.33	**46.10**	**9.90**	**10.58**			**85.73**	**44.45**	**41.28**	**86,000**	**139,500**	**11,800**	**9,300**	**5,590**	**1.660**	**1.417**
			6.99	EU-G105	2 3/8 SL-H90	3 1/4	1 13/16	1.670	193,500	270,200	8,700	6,800 p	4,130	0.134	0.111
			10.40			**82.55**	**46.04**	**42.42**	**86,000**	**120,200**	**11,800**	**9,300**	**5,600**	**1.669**	**1.377**
			7.11	EU-S135	NC26 (2 3/8 IF)	3 3/8	1 3/4	1.625	248,700	313,600	11,200	6,800 b	4,120	0.134	0.114
			10.58			**85.73**	**44.45**	**41.28**	**110,600**	**139,500**	**15,200**	**9,300**	**5,590**	**1.660**	**1.417**
			7.50	EU-E75	NC31(2 7/8 IF)	4 1/8	2 1/8	2.000	135,900	447,100	8,000	11,800 p	7,080	0.239	0.125
2 7/8	2.441	6.85	**11.16**			**104.78**	**53.98**	**50.80**	**60,400**	**198,800**	**10,900**	**16,000**	**9,600**	**2.964**	**1.558**
73.0	**62.00**	**10.19**	7.31	EU-E75	2 7/8 WO	4 1/8	2 7/16	2.253	135,900	277,500	8,000	7,100 p	4,310	0.243	0.121
			10.88			**104.78**	**61.91**	**57.23**	**60,400**	**123,400**	**10,900**	**9,700**	**5,850**	**3.019**	**1.503**
			6.93	EU-E75	2 7/8 OHLW	3 3/4	2 7/16	2.253	135,900	223,900	8,000	5,500 p	3,350	0.243	0.112
			10.31			**95.25**	**61.91**	**57.23**	**60,400**	**99,600**	**10,900**	**7,500**	**4,540**	**3.019**	**1.391**
			7.05	EU-E75	2 7/8 SL-H90	3 7/8	2 7/16	2.296	135,900	260,700	8,000	7,600 p	4,570	0.243	0.115
			10.49			**98.43**	**61.91**	**58.32**	**60,400**	**116,000**	**10,900**	**10,300**	**6,200**	**3.019**	**1.427**
	2.151	10.40	10.87	EU-E75	NC31 (2 7/8 IF)	4 1/8	2 1/8	1.963	214,300	447,100	11,500	11,800 p	7,120	0.188	0.176
	54.64	**15.48**	**16.18**			**104.78**	**53.98**	**49.86**	**95,300**	**198,800**	**15,600**	**16,000**	**9,650**	**2.340**	**2.182**
			11.19	IU-E75	2 7/8 XH	4 1/4	1 7/8	1.750	214,300	505,000	11,500	13,200 p	7,960	0.185	0.182
			16.65			**107.95**	**47.63**	**44.45**	**95,300**	**224,600**	**15,600**	**18,000**	**10,800**	**2.302**	**2.260**
			10.35	IU-E75	NC26 (2 3/8 IF)	3 3/8	1 3/4	1.625	214,300	313,600	11,500	6,800 b	4,120	0.184	0.163
			15.40			**85.73**	**44.45**	**41.28**	**95,300**	**139,500**	**15,600**	**9,300**	**5,590**	**2.285**	**2.023**
			10.46	IU-E75	NC26 (2 3/8 IF)	3 1/2	1 3/4	1.625	214,300	313,600	11,500	7,100 p	4,290	0.184	0.166
			15.57			**88.90**	**44.45**	**41.28**	**95,300**	**139,500**	**15,600**	**9,700**	**5,820**	**2.285**	**2.055**
			10.57	IU-E75	NC26 (2 3/8 IF)	3 5/8	1 3/4	1.625	214,300	313,600	11,500	7,200 p	4,330	0.184	0.168
			15.73			**92.08**	**44.45**	**41.28**	**95,300**	**139,500**	**15,600**	**9,700**	**5,870**	**2.285**	**2.089**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
2 7/8	2.151	10.40	10.59	EU-E75	2 7/8 OHSW	3 7/8	2 5/32	1.963	214,300	345,500	11,500	8,800 p	5,270	0.189	0.169
73.0	**54.64**	**15.48**	**15.76**			**98.43**	**54.77**	**49.86**	**95,300**	**153,700**	**15,600**	**11,900**	**7,140**	**2.345**	**2.100**
			10.51	EU-E75	2 7/8 SL-H90	3 7/8	2 1/8	2.000	214,300	395,300	11,500	11,600 p	7,000	0.188	0.170
			15.64			**98.43**	**53.98**	**50.80**	**95,300**	**175,800**	**15,600**	**15,800**	**9,490**	**2.340**	**2.106**
			10.59	EU-E75	2 7/8 SL-H90	3 7/8	2 5/32	2.006	214,300	382,700	11,500	11,200 p	6,770	0.189	0.169
			15.76			**98.43**	**54.77**	**50.95**	**95,300**	**170,200**	**15,600**	**15,300**	**9,180**	**2.345**	**2.100**
			10.27	IU-E75	2 7/8 PAC	3 1/8	1 1/2	1.375	214,300	273,000	11,500	5,700 p	3,430	0.181	0.160
			15.28			**79.38**	**38.10**	**34.93**	**95,300**	**121,400**	**15,600**	**7,700**	**4,660**	**2.254**	**1.992**
			11.09	EU-X95	NC31 (2 7/8 IF)	4 1/8	2	1.875	271,500	495,700	14,600	13,100 p	7,910	0.187	0.177
			16.50			**104.78**	**50.80**	**47.63**	**120,700**	**220,500**	**19,800**	**17,800**	**10,730**	**2.321**	**2.201**
			10.51	EU-X95	2 7/8 SL-H90	3 7/8	2 5/32	2.031	271,500	382,700	14,600	11,200 p	6,770	0.189	0.169
			15.64			**98.43**	**54.77**	**51.59**	**120,700**	**170,200**	**19,800**	**15,300**	**9,180**	**2.345**	**2.100**
			10.95	EU-X95	2 7/8 SL-H90	4	2	1.875	271,500	443,900	14,600	13,200 p	7,930	0.187	0.174
			16.30			**101.60**	**50.80**	**47.63**	**120,700**	**197,400**	**19,800**	**17,900**	**10,760**	**2.321**	**2.163**
			10.27	IU-X95	2 7/8 PAC	3 1/8	1 1/2	1.375	271,500	273,000	14,600	5,700 p	3,430	0.181	0.160
			15.28			**79.38**	**38.10**	**34.93**	**120,700**	**121,400**	**19,800**	**7,700**	**4,660**	**2.254**	**1.992**
			11.09	EU-G105	NC31 (2 7/8 IF)	4 1/8	2	1.875	300,000	495,700	16,100	13,300 p	7,910	0.187	0.177
			16.50			**104.78**	**50.80**	**47.63**	**133,400**	**220,500**	**21,900**	**18,100**	**10,730**	**2.321**	**2.201**
			10.95	EU-G105	2 7/8 SL-H90	4	2	1.875	300,000	443,900	16,100	13,200 p	7,930	0.187	0.174
			16.30			**101.60**	**50.80**	**47.63**	**133,400**	**197,400**	**21,900**	**17,900**	**10,750**	**2.321**	**2.163**
			10.27	IU-G105	2 7/8 PAC	3 1/8	1 1/2	1.375	300,000	273,000	16,100	5,700 p	3,430	0.181	0.160
			15.28			**79.38**	**38.10**	**34.93**	**133,400**	**121,400**	**21,900**	**7,700**	**4,660**	**2.254**	**1.992**
			11.55	EU-S135	NC31(2 7/8 IF)	4 1/8	2	1.875	385,800	495,700	20,700	13,100 p	7,910	0.187	0.177
			17.19			**104.78**	**50.80**	**47.63**	**171,600**	**220,500**	**28,100**	**17,800**	**10,730**	**2.321**	**2.201**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
2 7/8 **73.0**	2.151 **54.64**	10.40 **15.48**	11.55 **17.19**	EU-S135	NC31 (2 7/8 IF)	4 3/8 **111.13**	1 5/8 **41.28**	1.500 **38.10**	385,800 **171,600**	623,800 **277,400**	20,700 **28,100**	17,100 p **23,200**	10,160 **13,780**	0.183 **2.269**	0.188 **2.334**
			10.51 **15.64**	EU-S135	2 7/8 SL-H90	3 7/8 **98.43**	2 1/8 **53.98**	1.963 **49.86**	385,800 **171,600**	395,300 **175,800**	20,700 **28,100**	11,600 p **15,800**	7,000 **9,490**	0.188 **2.340**	0.170 **2.106**
			11.26 **16.76**	EU-S135	2 7/8 SL-H90	4 1/8 **104.78**	1 5/8 **41.28**	1.500 **38.10**	385,800 **171,600**	572,000 **254,400**	20,700 **28,100**	17,200 p **23,300**	10,330 **14,010**	0.183 **2.269**	0.181 **2.253**
			10.44 **15.54**	IU-S135	2 7/8 PAC	3 1/8 **79.38**	1 1/4 **31.75**	1.125 **28.58**	385,800 **171,600**	337,800 **150,200**	20,700 **28,100**	6,800 b **9,200**	4,080 **5,540**	0.179 **2.228**	0.162 **2.018**
			10.27 **15.28**	IU-S135	2 7/8 PAC	3 1/8 **79.38**	1 1/2 **38.10**	1.375 **34.93**	385,800 **171,600**	273,000 **121,400**	20,700 **28,100**	5,700 p **7,700**	3,430 **4,660**	0.181 **2.254**	0.160 **1.992**
			10.70 **15.92**	IU-S135	NC26 (2 7/8 SH)	3 5/8 **92.08**	1 3/4 **44.45**	1.625 **41.28**	385,800 **391,900**	313,600 **644,200**	20,700 **172,200**	7,200 p **99,800**	4,330 **5,870**	0.184 **2.285**	0.168 **2.089**
3 1/2 **88.9**	2.992 **76.00**	9.50 **14.14**	10.58 **15.74**	EU-E75	NC38 (3 1/2 IF)	4 3/4 **120.65**	3 **76.20**	2.867 **72.82**	194,200 **86,400**	419,700 **186,700**	14,100 **19,100**	12,800 p **17,300**	7,680 **10,420**	0.365 **4.538**	0.166 **2.063**
			10.58 **15.74**	EU-E75	NC38 (3 1/2 IF)	4 3/4 **120.65**	2 11/16 **68.26**	2.563 **65.10**	194,200 **86,400**	587,300 **261,200**	14,100 **19,100**	18,100 p **24,500**	10,860 **14,720**	0.360 **4.470**	0.172 **2.130**
			9.84 **14.64**	EU-E75	3 1/2 OHLW	4 1/2 **114.30**	3 **76.20**	2.804 **71.22**	194,200 **86,400**	392,000 **174,400**	14,100 **19,100**	11,800 p **16,000**	7,210 **9,780**	0.365 **4.538**	0.159 **1.974**
			10.34 **15.39**	EU-E75	3 1/2 OHLW	4 3/4 **120.65**	3 **76.20**	2.804 **71.22**	194,200 **86,400**	392,000 **174,400**	14,100 **19,100**	12,000 p **16,300**	7,210 **9,780**	0.365 **4.538**	0.166 **2.063**
			9.99 **14.87**	EU-E75	3 1/2 SL-H90	4 5/8 **117.48**	3 **76.20**	2.847 **72.31**	194,200 **86,400**	366,700 **163,100**	14,100 **19,100**	12,600 p **17,100**	7,580 **10,280**	0.365 **4.538**	0.162 **2.018**
			10.14 **15.09**	EU-E75	3 1/2 WO	4 3/4 **120.65**	3 **76.20**	2.804 **71.22**	194,200 **86,400**	419,700 **186,700**	14,100 **19,100**	12,800 p **17,400**	7,720 **10,470**	0.365 **4.538**	0.166 **2.063**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. mm	in mm	lb/ft kg/m	lb/ft kg/m			in mm	in mm	in mm	lb daN	lb daN	ft-lb N.m	ft-lb N.m	ft-lb N.m	U.S.gal/ft Liter/m	U.S.gal/ft Liter/m
3 1/2 **88.9**	2.764 **70.21**	13.30 **19.79**	13.78 **20.51**	EU-E75	NC38 (3 1/2 IF)	4 5/8 **117.48**	2 11/16 **68.26**	2.563 **65.09**	271,500 **120,700**	587,300 **261,200**	18,500 **25,100**	15,500 b **21,100**	9,340 **12,670**	0.310 **3.855**	0.217 **2.701**
			14.05 **20.91**	EU-E75	NC38 (3 1/2 IF)	4 3/4 **120.65**	2 9/16 **65.09**	2.438 **61.93**	322,700 **143,500**	649,100 **288,700**	21,000 **28,500**	19,100 b **25,900**	11,500 **15,590**	0.308 **3.830**	0.223 **2.770**
			13.93 **20.73**	EU-E75	NC38 (3 1/2 IF)	4 3/4 **120.65**	2 11/16 **68.26**	2.457 **62.41**	271,500 **120,700**	587,300 **261,200**	18,500 **25,100**	18,100 p **24,500**	10,860 **14,720**	0.310 **3.855**	0.221 **2.745**
			14.13 **21.03**	EU-E75	NC38 (3 1/2 IF)	4 7/8 **123.83**	2 11/16 **68.26**	2.563 **65.09**	271,500 **120,700**	587,300 **261,200**	18,500 **25,100**	18,200 p **24,700**	10,930 **14,820**	0.310 **3.855**	0.225 **2.791**
			13.40 **19.94**	IU-E75	NC31 (3 1/2 SH)	4 1/8 **104.78**	2 1/8 **53.98**	2.000 **50.80**	271,500 **120,700**	447,100 **198,800**	18,500 **25,100**	11,800 p **16,000**	7,120 **9,650**	0.302 **3.752**	0.212 **2.637**
			13.75 **20.46**	EU-E75	3 1/2 OHSW	4 3/4 **120.65**	2 11/16 **68.26**	2.414 **61.32**	271,500 **120,700**	559,500 **248,900**	18,500 **25,100**	17,300 p **23,400**	10,380 **14,080**	0.310 **3.855**	0.221 **2.745**
			14.37 **21.38**	EU-E75	3 1/2 H90	5 1/4 **133.35**	2 3/4 **69.85**	2.619 **66.52**	271,500 **120,700**	664,000 **295,300**	18,500 **25,100**	23,800 p **32,300**	14,300 **19,380**	0.311 **3.868**	0.235 **2.923**
			13.91 **20.70**	EU-E75	3 1/2 XH	4 3/4 **120.65**	2 7/16 **61.91**	2.313 **58.75**	271,500 **120,700**	570,900 **253,900**	18,500 **25,100**	17,000 p **23,100**	10,240 **13,890**	0.306 **3.806**	0.225 **2.794**
			13.98 **20.80**	EU-X95	NC38(3 1/2 IF)	4 5/8 **117.48**	2 11/16 **68.26**	2.563 **65.09**	343,900 **153,000**	587,300 **261,200**	23,400 **31,800**	15,500 b **21,100**	9,340 **12,670**	0.310 **3.855**	0.217 **2.701**
			14.25 **21.21**	EU-X95	NC38(3 1/2 IF)	4 3/4 **120.65**	2 9/16 **65.09**	2.438 **61.93**	343,900 **153,000**	649,100 **288,700**	23,400 **31,800**	19,100 b **25,900**	11,500 **15,590**	0.308 **3.830**	0.223 **2.770**
			14.15 **21.06**	EU-X95	NC38(3 1/2 IF)	4 3/4 **120.65**	2 11/16 **68.26**	2.563 **65.09**	343,900 **153,000**	587,300 **261,200**	23,400 **31,800**	18,100 p **24,500**	10,860 **14,720**	0.310 **3.855**	0.221 **2.745**
			14.43 **21.47**	EU-X95	NC38(3 1/2 IF)	4 7/8 **123.83**	2 9/16 **65.09**	2.438 **61.93**	343,900 **153,000**	649,100 **288,700**	23,400 **31,800**	20,100 p **27,300**	12,110 **16,420**	0.308 **3.830**	0.227 **2.816**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. mm	in mm	lb/ft kg/m	lb/ft kg/m			in mm	in mm	in mm	lb daN	lb daN	ft-lb N.m	ft-lb N.m	ft-lb N.m	U.S.gal/ft Liter/m	U.S.gal/ft Liter/m
3 1/2 **88.9**	2.764 **70.21**	13.30 **19.79**	14.33 **21.33**	EU-X95	NC38(3 1/2 IF)	4 7/8 **123.83**	2 11/16 **68.26**	2.563 **65.09**	343,900 **153,000**	587,300 **261,200**	23,400 **31,800**	18,200 p **24,700**	10,930 **14,820**	0.310 **3.855**	0.225 **2.791**
			14.62 **21.76**	EU-X95	NC38 (3 1/2 IF)	5 **127.00**	2 9/16 **65.09**	2.438 **61.93**	343,900 **153,000**	649,100 **288,700**	23,400 **31,800**	20,300 p **27,500**	12,190 **16,530**	0.308 **3.830**	0.231 **2.863**
			14.06 **20.92**	EU-X95	3 1/2 SL-H90	4 5/8 **117.48**	2 11/16 **68.26**	2.563 **65.10**	343,900 **153,000**	534,200 **237,600**	23,400 **31,800**	18,500 p **25,100**	11,140 **15,100**	0.310 **3.855**	0.217 **2.701**
			14.06 **20.92**	EU-X95	3 1/2 SL-H90	4 3/4 **120.65**	2 9/16 **65.09**	2.438 **61.93**	343,900 **153,000**	596,000 **265,100**	23,400 **31,800**	20,800 p **28,300**	12,520 **16,980**	0.308 **3.830**	0.223 **2.770**
			14.60 **21.73**	EU-X95	3 1/2 H90	5 1/4 **133.35**	2 3/4 **69.85**	2.619 **66.52**	343,900 **153,000**	664,000 **295,300**	23,400 **31,800**	23,800 p **32,300**	14,300 **19,380**	0.311 **3.868**	0.235 **2.923**
			13.71 **20.40**	IU-X95	NC31(3 1/2 SH)	4 1/8 **104.78**	2 1/8 **53.98**	2.000 **50.80**	343,900 **153,000**	447,100 **198,800**	23,400 **31,800**	11,800 p **16,000**	7,120 **9,650**	0.302 **3.752**	0.212 **2.637**
			13.98 **20.80**	EU-G105	NC38(3 1/2 IF)	4 5/8 **117.48**	2 11/16 **68.26**	2.563 **65.09**	380,100 **169,100**	587,300 **261,200**	25,900 **35,200**	15,500 b **21,100**	9,340 **12,670**	0.310 **3.855**	0.217 **2.701**
			14.15 **21.06**	EU-G105	NC38(3 1/2 IF)	4 3/4 **120.65**	2 11/16 **68.26**	2.563 **65.09**	380,100 **169,100**	587,300 **261,200**	25,900 **35,200**	18,100 p **24,500**	10,860 **14,720**	0.310 **3.855**	0.221 **2.745**
			14.33 **21.33**	EU-G105	NC38(3 1/2 IF)	4 7/8 **123.83**	2 11/16 **68.26**	2.563 **65.09**	380,100 **169,100**	587,300 **261,200**	25,900 **35,200**	18,200 p **24,700**	10,930 **14,820**	0.310 **3.855**	0.225 **2.791**
			14.71 **21.89**	EU-G105	NC38 (3 1/2 IF)	5 **127.00**	2 7/16 **61.91**	2.313 **58.75**	380,100 **169,100**	708,000 **314,900**	25,900 **35,200**	22,200 p **30,100**	13,320 **18,070**	0.306 **3.806**	0.232 **2.887**
			14.06 **20.92**	EU-G105	3 1/2 SL-H90	4 3/4 **120.65**	2 9/16 **65.09**	2.438 **61.93**	380,100 **169,100**	596,000 **265,100**	25,900 **35,200**	20,800 p **28,300**	12,520 **16,980**	0.308 **3.830**	0.223 **2.770**
			13.71 **20.40**	IU-G105	NC31(3 1/2 SH)	4 1/8 **104.78**	2 1/8 **53.98**	2.000 **50.80**	380,100 **169,100**	447,100 **198,800**	25,900 **35,200**	11,800 p **16,000**	7,120 **9,650**	0.302 **3.752**	0.212 **2.637**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
3 1/2	2.764	13.30	15.13	EU-S135	NC40(4FH)	5 3/8	2 7/16	2.313	488,800	897,100	33,300	29,900 p	17,950	0.306	0.244
88.9	**70.21**	**19.79**	**22.52**			**136.53**	**61.91**	**58.75**	**217,400**	**399,000**	**45,200**	**40,500**	**24,340**	**3.806**	**3.036**
			14.07	EU-S135	NC38 (3 1/2 IF)	4 5/8	2 9/16	2.438	488,800	649,100	33,300	15,500 b	9,340	0.308	0.219
			20.94			**117.48**	**65.09**	**61.91**	**217,400**	**288,700**	**45,200**	**21,100**	**12,670**	**3.830**	**2.726**
			14.25	EU-S135	NC38 (3 1/2 IF)	4 3/4	2 9/16	2.438	488,800	649,100	33,300	19,100 b	11,500	0.308	0.223
			21.21			**120.65**	**65.09**	**61.91**	**217,400**	**288,700**	**45,200**	**25,900**	**15,590**	**3.830**	**2.770**
			14.43	EU-S135	NC38 (3 1/2 IF)	4 7/8	2 9/16	2.438	488,800	649,100	33,300	20,100 p	12,110	0.308	0.227
			21.47			**123.83**	**65.09**	**61.91**	**217,400**	**288,700**	**45,200**	**27,300**	**16,420**	**3.830**	**2.816**
			14.92	EU-S135	NC38 (3 1/2 IF)	5	2 1/8	2.000	488,800	842,400	33,300	26,500 p	15,090	0.302	0.237
			22.20			**127.00**	**53.98**	**50.80**	**217,400**	**374,700**	**45,200**	**35,900**	**20,450**	**3.752**	**2.942**
			14.65	EU-S135	3 1/2 SL-H90	5	2 1/8	2.000	488,800	789,300	33,300	28,000 p	16,840	0.302	0.237
			21.80			**127.00**	**53.98**	**50.80**	**217,400**	**351,100**	**45,200**	**38,000**	**22,830**	**3.752**	**2.942**
			13.71	IU-S135	NC31(3 1/2 SH)	4 1/8	2 1/8	2.000	488,800	447,100	33,300	11,800 p	7,120	0.302	0.212
			20.40			**104.78**	**53.98**	**50.80**	**217,400**	**198,800**	**45,200**	**16,000**	**9,650**	**3.752**	**2.637**
	2.602	15.50	16.41	EU-E75	NC38 (3 1/2 IF)	4 5/8	2 9/16	2.438	322,700	649,100	21,000	15,500 b	9,340	0.276	0.252
	66.09	**23.07**	**24.42**			**117.48**	**65.09**	**61.91**	**143,500**	**288,700**	**28,500**	**21,100**	**12,670**	**3.423**	**3.133**
			16.58	EU-E75	NC38 (3 1/2 IF)	4 3/4	2 9/16	2.438	322,700	649,100	21,000	19,100 b	11,500	0.276	0.256
			24.67			**120.65**	**65.09**	**61.91**	**143,500**	**288,700**	**28,500**	**25,900**	**15,590**	**3.423**	**3.178**
			16.76	EU-E75	NC38 (3 1/2 IF)	4 7/8	2 9/16	2.438	322,700	649,100	21,000	20,100 p	12,110	0.276	0.260
			24.94			**123.83**	**65.09**	**61.91**	**143,500**	**288,700**	**28,500**	**27,300**	**16,420**	**3.423**	**3.224**
			16.95	EU-E75	NC38 (3 1/2 IF)	5	2 9/16	2.414	322,700	649,100	21,000	20,300 p	12,190	0.276	0.263
			25.22			**127.00**	**65.09**	**61.32**	**143,500**	**288,700**	**28,500**	**27,500**	**16,530**	**3.423**	**3.271**
			16.20	EU-X95	NC38 (3 1/2 IF)	4 5/8	2 9/16	2.438	408,800	649,100	26,700	15,500 b	9,340	0.276	0.252
			24.11			**117.48**	**65.09**	**61.91**	**181,800**	**288,700**	**36,200**	**21,100**	**12,670**	**3.423**	**3.133**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
3 1/2	2.602	15.50	16.37	EU-X95	NC38 (3 1/2 IF)	4 3/4	2 9/16	2.438	408,800	649,100	26,700	19,100 b	11,500	0.276	0.256
88.9	**66.09**	**23.07**	**24.36**			**120.65**	**65.09**	**61.91**	**181,800**	**288,700**	**36,200**	**25,900**	**15,590**	**3.423**	**3.178**
			16.55	EU-X95	NC38 (3 1/2 IF)	4 7/8	2 9/16	2.438	408,800	649,100	26,700	20,100 p	12,110	0.276	0.260
			24.63			**123.83**	**65.09**	**61.91**	**181,800**	**288,700**	**36,200**	**27,300**	**16,420**	**3.423**	**3.224**
			16.82	EU-X95	NC38 (3 1/2 IF)	5	2 7/16	2.313	408,800	708,000	26,700	22,200 p	13,320	0.274	0.265
			25.03			**127.00**	**61.91**	**58.75**	**181,800**	**314,900**	**36,200**	**30,100**	**18,070**	**3.399**	**3.294**
			15.85	IU-X95	NC31(3 1/2 SH)	4 1/8	2 1/8	2.000	408,800	447,100	26,700	11,800 p	7,120	0.269	0.245
			23.59			**104.78**	**53.98**	**50.80**	**181,800**	**198,800**	**36,200**	**16,000**	**9,650**	**3.345**	**3.044**
			16.20	EU-G105	NC38 (3 1/2 IF)	4 5/8	2 9/16	2.438	451,800	649,100	29,500	15,500 b	9,340	0.276	0.252
			24.11			**117.48**	**65.09**	**61.91**	**201,000**	**288,700**	**40,000**	**21,100**	**12,670**	**3.423**	**3.133**
			16.37	EU-G105	NC38 (3 1/2 IF)	4 3/4	2 9/16	2.438	451,800	649,100	29,500	19,100 b	11,500	0.276	0.256
			24.36			**120.65**	**65.09**	**61.91**	**201,000**	**288,700**	**40,000**	**25,900**	**15,590**	**3.423**	**3.178**
			16.14	EU-G105	NC38 (3 1/2 IF)	4 7/8	2 9/16	2.438	451,800	649,100	29,500	20,100 p	12,110	0.276	0.260
			24.02			**123.83**	**65.09**	**61.91**	**201,000**	**288,700**	**40,000**	**27,300**	**16,420**	**3.423**	**3.224**
			17.03	EU-G105	NC38 (3 1/2 IF)	5	2 1/8	2.000	451,800	842,400	29,500	26,500 p	15,900	0.269	0.270
			25.34			**127.00**	**53.98**	**50.80**	**201,000**	**374,700**	**40,000**	**35,900**	**21,560**	**3.345**	**3.349**
			16.97	EU-G105	NC40 (4 FH)	5 1/4	2 9/16	2.438	451,800	838,200	29,500	27,700 p	16,650	0.276	0.271
			25.25			**133.35**	**65.09**	**61.93**	**201,000**	**372,800**	**40,000**	**37,600**	**22,580**	**3.423**	**3.368**
			17.57	EU-S135	NC40(4FH)	5 1/2	2 1/4	2.125	580,900	979,900	37,900	32,900 p	19,760	0.271	0.284
			26.15			**139.70**	**57.15**	**53.98**	**258,400**	**435,900**	**51,400**	**44,600**	**26,790**	**3.365**	**3.528**
			16.20	EU-S135	NC38 (3 1/2 IF)	4 5/8	2 9/16	2.438	580,900	649,100	37,900	15,500 b	9,340	0.276	0.252
			24.11			**117.48**	**65.09**	**61.91**	**258,400**	**288,700**	**51,400**	**21,100**	**12,670**	**3.423**	**3.133**
			16.37	EU-S135	NC38 (3 1/2 IF)	4 3/4	2 9/16	2.438	580,900	649,100	37,900	19,100 b	11,500	0.276	0.256
			24.36			**120.65**	**65.09**	**61.91**	**258,400**	**288,700**	**51,400**	**25,900**	**15,590**	**3.423**	**3.178**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
3 1/2 **88.9**	2.602 **66.09**	15.50 **23.07**	16.55 **24.63**	EU-S135	NC38 (3 1/2 IF)	4 7/8 **123.83**	2 9/16 **65.09**	2.438 **61.91**	580,900 **258,400**	649,100 **288,700**	37,900 **51,400**	20,100 p **27,300**	12,110 **16,420**	0.276 **3.423**	0.260 **3.224**
			16.80 **25.00**	EU-S135	NC38 (3 1/2 IF)	5 **127.00**	2 7/16 **61.91**	2.313 **58.75**	580,900 **258,400**	708,000 **314,900**	37,900 **51,400**	22,200 p **30,100**	13,320 **18,070**	0.274 **3.399**	0.265 **3.294**
4 **101.6**	3.476 **88.29**	11.85 **17.63**	13.52 **20.12**	EU-E75	NC46 (4 IF)	6 **152.40**	3 1/4 **82.55**	3.125 **79.38**	230,700 **102,600**	901,100 **400,800**	19,400 **26,400**	33,600 p **45,500**	20,170 **27,350**	0.488 **6.064**	0.226 **2.806**
			12.91 **19.21**	EU-E75	4 WO	5 3/4 **146.05**	3 7/16 **87.31**	3.313 **84.15**	230,700 **102,600**	782,900 **348,200**	19,400 **26,400**	28,800 p **39,000**	17,280 **23,430**	0.492 **6.112**	0.213 **2.646**
			12.10 **18.01**	EU-E75	4 OH LW	5 1/4 **133.35**	3 15/32 **88.11**	3.287 **83.49**	230,700 **102,600**	621,300 **276,300**	19,400 **26,400**	21,900 p **29,700**	13,180 **17,870**	0.493 **6.120**	0.195 **2.428**
			13.00 **19.35**	IU-E75	4 H90	5 1/2 **139.70**	2 13/16 **71.44**	2.688 **68.28**	230,700 **102,600**	913,700 **406,400**	19,400 **26,400**	35,300 p **47,900**	21,220 **28,770**	0.480 **5.963**	0.216 **2.688**
	3.340 **84.84**	14.00 **20.83**	15.04 **22.38**	IU-E75	NC40 (4 FH)	5 1/4 **133.35**	2 13/16 **71.44**	2.688 **68.28**	285,300 **126,900**	711,600 **316,500**	23,200 **31,500**	23,400 p **31,800**	14,090 **19,100**	0.445 **5.529**	0.243 **3.019**
			15.85 **23.59**	EU-E75	NC46 (4 IF)	6 **152.40**	3 1/4 **82.55**	3.125 **79.38**	285,300 **126,900**	901,100 **400,800**	23,200 **31,500**	33,600 p **45,500**	20,170 **27,350**	0.453 **5.630**	0.261 **3.240**
			14.35 **21.36**	IU-E75	4 SH	4 5/8 **117.48**	2 9/16 **65.09**	2.438 **61.93**	285,300 **126,900**	512,000 **227,700**	23,200 **31,500**	15,100 p **20,500**	9,100 **12,340**	0.441 **5.478**	0.228 **2.835**
			15.02 **22.35**	EU-E75	4 OHSW	5 1/2 **139.70**	3 1/4 **82.55**	3.125 **79.38**	285,300 **126,900**	759,800 **338,000**	23,200 **31,500**	27,200 p **36,900**	16,320 **22,120**	0.453 **5.630**	0.243 **3.021**
			15.43 **22.96**	IU-E75	4 H90	5 1/2 **139.70**	2 13/16 **71.44**	2.688 **68.28**	285,300 **126,900**	913,700 **406,400**	23,200 **31,500**	35,300 p **47,900**	21,220 **28,770**	0.445 **5.529**	0.251 **3.122**
			14.57 **21.68**	IU-E75	4SH (3 1/2 XH)	4 3/4 **120.65**	2 7/16 **61.91**	2.313 **58.74**	285,300 **126,900**	570,900 **253,900**	23,200 **31,500**	17,000 p **23,100**	10,240 **13,890**	0.439 **5.454**	0.234 **2.904**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in.	in	lb/ft	lb/ft			in	in	in	lb	lb	ft-lb	ft-lb	ft-lb	U.S.gal/ft	U.S.gal/ft
mm	mm	kg/m	kg/m			mm	mm	mm	daN	daN	N.m	N.m	N.m	Liter/m	Liter/m
4	3.340	14.00	15.34	IU-X95	NC40 (4 FH)	5 1/4	2 11/16	2.563	361,400	776,400	29,400	25,600 p	15,400	0.443	0.245
101.6	**84.84**	**20.83**	**22.83**			**133.35**	**68.26**	**65.10**	**160,700**	**345,300**	**39,900**	**34,800**	**20,880**	**5.503**	**3.046**
			15.33	IU-X95	NC40 (4 FH)	5 1/4	2 13/16	2.688	361,400	711,600	29,400	23,400 p	14,090	0.445	0.243
			22.81			**133.35**	**71.44**	**68.26**	**160,700**	**316,500**	**39,900**	**31,800**	**19,100**	**5.529**	**3.019**
			16.19	EU-X95	NC46 (4 IF)	6	3 1/4	3.125	361,400	901,100	29,400	33,600 p	20,170	0.453	0.261
			24.09			**152.40**	**82.55**	**79.38**	**160,700**	**400,800**	**39,900**	**45,500**	**27,350**	**5.630**	**3.240**
			15.63	IU-X95	4 H90	5 1/2	2 13/16	2.688	361,400	913,700	29,400	35,300 p	21,220	0.445	0.251
			23.26			**139.70**	**71.44**	**68.28**	**160,700**	**406,400**	**39,900**	**47,900**	**28,770**	**5.529**	**3.122**
			14.88	IU-X95	4SH (3 1/2 XH)	4 3/4	2 7/16	2.313	361,400	570,900	29,400	17,000 p	10,240	0.439	0.234
			22.14			**120.65**	**61.91**	**58.74**	**160,700**	**253,900**	**39,900**	**23,100**	**13,890**	**5.454**	**2.904**
			15.91	IU-G105	NC40 (4 FH)	5 1/2	2 7/16	2.313	399,500	897,100	32,600	30,100 p	18,060	0.439	0.257
			23.68			**139.70**	**61.91**	**58.75**	**177,700**	**399,000**	**44,200**	**40,800**	**24,490**	**5.454**	**3.197**
			16.19	EU-G105	NC46 (4 IF)	6	3 1/4	3.125	399,500	901,100	32,600	33,600 p	20,170	0.453	0.261
			24.09			**152.40**	**82.55**	**79.38**	**177,700**	**400,800**	**44,200**	**45,500**	**27,350**	**5.630**	**3.240**
			15.63	IU-G105	4 H90	5 1/2	2 13/16	2.688	399,500	913,700	32,600	35,300 p	21,220	0.445	0.251
			23.26			**139.70**	**71.44**	**68.28**	**177,700**	**406,400**	**44,200**	**47,900**	**28,770**	**5.529**	**3.122**
			14.88	IU-G105	4SH (3 1/2 XH)	4 3/4	2 7/16	2.313	399,500	570,900	32,600	17,000 p	10,240	0.439	0.234
			22.14			**120.65**	**61.91**	**58.74**	**177,700**	**253,900**	**44,200**	**23,100**	**13,890**	**5.454**	**2.904**
			15.43	IU-S135	NC40 (4 FH)	5 1/4	2 11/16	2.563	513,600	776,400	41,900	25,600 p	15,400	0.443	0.245
			22.96			**133.35**	**68.26**	**65.09**	**228,400**	**345,300**	**56,800**	**34,800**	**20,880**	**5.503**	**3.046**
			15.33	IU-S135	NC40 (4 FH)	5 1/4	2 13/16	2.688	513,600	711,600	41,900	23,400 p	14,090	0.445	0.243
			22.81			**133.35**	**71.44**	**68.26**	**228,400**	**316,500**	**56,800**	**31,800**	**19,100**	**5.529**	**3.019**
			16.19	IU-S135	NC40 (4 FH)	5 1/2	2	1.875	513,600	1,080,100	41,900	36,300 p	21,810	0.433	0.263
			24.09			**139.70**	**50.80**	**47.63**	**228,400**	**480,400**	**56,800**	**49,300**	**29,580**	**5.380**	**3.271**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
4	3.340	14.00	15.63	IU-S135	4 H90	5 1/2	2 13/16	2.688	513,600	913,700	41,900	35,300 p	21,220	0.445	0.251
101.6	**84.84**	**20.83**	**23.26**			**139.70**	**71.44**	**68.28**	**228,400**	**406,400**	**56,800**	**47,900**	**28,770**	**5.529**	**3.122**
			16.42	EU-S135	NC46 (4 IF)	6	3	2.875	513,600	1,048,400	41,900	39,200 p	23,530	0.449	0.266
			24.44			**152.40**	**76.20**	**73.03**	**228,400**	**466,300**	**56,800**	**53,100**	**31,910**	**5.570**	**3.300**
			14.88	IU-S135	4SH (3 1/2 XH)	4 3/4	2 7/16	2.313	513,600	570,900	41,900	17,000 p	10,240	0.439	0.234
			22.14			**120.65**	**61.91**	**58.74**	**228,400**	**253,900**	**56,800**	**23,100**	**13,890**	**5.454**	**2.904**
			14.80	IU-S135	4SH (3 1/2 XH)	4 3/4	2 9/16	2.438	513,600	512,000	41,900	15,200 p	9,160	0.441	0.232
			22.02			**120.65**	**65.09**	**61.91**	**228,400**	**227,700**	**56,800**	**20,700**	**12,420**	**5.478**	**2.880**
	3.240	15.70	16.80	IU-E75	NC40 (4 FH)	5 1/4	2 11/16	2.563	324,100	776,400	25,800	25,600 p	15,400	0.418	0.270
	82.30	**23.36**	**25.00**			**133.35**	**68.26**	**65.10**	**144,100**	**345,300**	**34,900**	**34,800**	**20,880**	**5.194**	**3.354**
			17.54	EU-E75	NC46 (4 IF)	6	3 1/4	3.095	324,100	901,100	25,800	33,600 p	20,170	0.429	0.286
			26.10			**152.40**	**82.55**	**78.61**	**144,100**	**400,800**	**34,900**	**45,500**	**27,350**	**5.322**	**3.548**
			17.09	IU-E75	4 H90	5 1/2	2 13/16	2.688	324,100	913,700	25,800	35,300 p	21,220	0.420	0.276
			25.43			**139.70**	**71.44**	**68.28**	**144,100**	**406,400**	**34,900**	**47,900**	**28,770**	**5.221**	**3.430**
			17.15	IU-E75	4SH (3 1/2 XH)	4 3/4	2 7/16	2.313	324,100	570,900	25,800	17,000 p	10,240	0.414	0.259
			25.52			**120.65**	**61.91**	**58.74**	**144,100**	**253,900**	**34,900**	**23,100**	**13,890**	**5.145**	**3.212**
			17.52	IU-X95	NC40 (4 FH)	5 1/2	2 7/16	2.313	410,500	897,100	32,600	30,100 p	18,060	0.414	0.282
			26.07			**139.70**	**61.91**	**58.75**	**182,600**	**399,000**	**44,300**	**40,800**	**24,490**	**5.145**	**3.505**
			18.02	EU-X95	NC46 (4 IF)	6	3	2.875	410,500	1,048,400	32,600	39,200 p	23,530	0.424	0.291
			26.82			**152.40**	**76.20**	**73.03**	**182,600**	**466,300**	**44,300**	**53,100**	**31,910**	**5.262**	**3.608**
			17.80	EU-X95	NC46 (4 IF)	6	3 1/4	3.125	410,500	901,100	32,600	33,600 p	20,170	0.429	0.286
			26.49			**152.40**	**82.55**	**79.37**	**182,600**	**400,800**	**44,300**	**45,500**	**27,350**	**5.322**	**3.548**
			17.23	IU-X95	4 H90	5 1/2	2 13/16	2.688	410,500	913,700	32,600	35,300 p	21,220	0.420	0.276
			25.64			**139.70**	**71.44**	**68.28**	**182,600**	**406,400**	**44,300**	**47,900**	**28,770**	**5.221**	**3.430**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
4 **101.6**	3.240 **82.30**	15.70 **23.36**	17.15 **25.52**	IU-X95	4SH (3 1/2 XH)	4 3/4 **120.65**	2 7/16 **61.91**	2.313 **58.74**	410,500 **182,600**	570,900 **253,900**	32,600 **44,300**	17,000 p **23,100**	10,240 **13,890**	0.414 **5.145**	0.259 **3.212**
			18.02 **26.82**	EU-G105	NC46 (4 IF)	6 **152.40**	3 **76.20**	2.875 **73.03**	453,700 **201,800**	1,048,400 **466,300**	36,100 **48,900**	39,200 p **53,100**	23,530 **31,910**	0.424 **5.262**	0.291 **3.608**
			17.80 **26.49**	EU-G105	NC46 (4 IF)	6 **152.40**	3 1/4 **82.55**	3.125 **79.37**	453,700 **201,800**	901,100 **400,800**	36,100 **48,900**	33,600 p **45,500**	20,170 **27,350**	0.429 **5.322**	0.286 **3.548**
			17.52 **26.07**	IU-G105	NC40 (4 FH)	5 1/2 **139.70**	2 7/16 **61.91**	2.313 **58.75**	453,700 **201,800**	897,100 **399,000**	36,100 **48,900**	30,100 p **40,800**	18,060 **24,490**	0.414 **5.145**	0.282 **3.505**
			17.23 **25.64**	IU-G105	4 H90	5 1/2 **139.70**	2 13/16 **71.44**	2.688 **68.28**	453,700 **201,800**	913,700 **406,400**	36,100 **48,900**	35,300 p **47,900**	21,220 **28,770**	0.420 **5.221**	0.276 **3.430**
			17.15 **25.52**	IU-G105	4SH (3 1/2 XH)	4 3/4 **120.65**	2 7/16 **61.91**	2.313 **58.74**	453,700 **201,800**	570,900 **253,900**	36,100 **48,900**	17,000 p **23,100**	10,240 **13,890**	0.414 **5.145**	0.259 **3.212**
			18.13 **26.98**	EU-S135	NC46 (4 IF)	6 **152.40**	2 7/8 **73.03**	2.750 **69.85**	583,400 **259,500**	1,117,600 **497,100**	46,400 **62,900**	41,800 p **56,700**	25,110 **34,050**	0.421 **5.234**	0.293 **3.636**
			18.02 **26.82**	EU-S135	NC46 (4 IF)	6 **152.40**	3 **76.20**	2.875 **73.03**	583,400 **259,500**	1,048,400 **466,300**	46,400 **62,900**	39,200 p **53,100**	23,530 **31,910**	0.424 **5.262**	0.291 **3.608**
			17.15 **25.52**	IU-S135	4SH (3 1/2 XH)	4 3/4 **120.65**	2 7/16 **61.91**	2.313 **58.74**	583,400 **259,500**	570,900 **253,900**	46,400 **62,900**	17,000 p **23,100**	10,240 **13,890**	0.414 **5.145**	0.259 **3.212**
4 1/2 **114.3**	3.958 **100.53**	13.75 **20.46**	15.23 **22.66**	IU-E75	4 1/2 H90	6 **152.40**	3 1/4 **82.55**	3.125 **79.38**	270,000 **120,100**	938,400 **417,400**	25,900 **35,100**	38,900 p **52,700**	23,350 **31,660**	0.623 **7.743**	0.251 **3.118**
			15.36 **22.86**	EU-E75	NC50 (4 1/2 IF)	6 5/8 **168.28**	3 3/4 **95.25**	3.625 **92.08**	270,000 **120,100**	939,000 **417,700**	25,900 **35,100**	38,000 p **51,600**	22,830 **30,960**	0.634 **7.877**	0.265 **3.286**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
4 1/2 **114.3**	3.958 **100.53**	13.75 **20.46**	14.04 **20.89**	EU-E75	4 1/2 OH	5 3/4 **146.05**	3 31/32 **100.81**	3.844 **97.64**	270,000 **120,100**	554,800 **246,800**	25,900 **35,100**	20,900 p **28,300**	12,560 **17,030**	0.639 **7.941**	0.226 **2.808**
			14.77 **21.98**	EU-E75	4 1/2 WO	6 1/8 **155.58**	3 7/8 **98.43**	3.750 **95.25**	270,000 **120,100**	849,200 **377,700**	25,900 **35,100**	33,600 p **45,600**	20,190 **27,370**	0.637 **7.913**	0.242 **3.006**
	3.826 **97.18**	16.60 **24.70**	18.14 **27.00**	IEU-E75	4 1/2 FH	6 **152.40**	3 **76.20**	2.875 **73.03**	330,500 **147,000**	976,100 **434,200**	30,800 **41,700**	34,700 p **47,100**	20,860 **28,290**	0.580 **7.202**	0.295 **3.659**
			18.37 **27.34**	IEU-E75	NC46 (4 IF)	6 1/4 **158.75**	3 1/4 **82.55**	3.125 **79.38**	330,500 **147,000**	901,100 **400,800**	30,800 **41,700**	33,900 p **46,000**	20,390 **27,650**	0.585 **7.262**	0.299 **3.716**
			17.07 **25.40**	IEU-E75	4 1/2 OHSW	5 7/8 **149.23**	3 3/4 **95.25**	3.625 **92.08**	330,500 **147,000**	713,900 **317,500**	30,800 **41,700**	27,200 p **36,900**	16,340 **22,160**	0.595 **7.395**	0.275 **3.410**
			17.95 **26.71**	IEU-E75	NC50 (4 1/2 IF)	6 5/8 **168.28**	3 3/4 **95.25**	3.625 **92.08**	330,500 **147,000**	939,000 **417,700**	30,800 **41,700**	37,600 p **51,000**	22,830 **30,960**	0.595 **7.395**	0.303 **3.767**
			17.92 **26.67**	IEU-E75	4 1/2 H90	6 **152.40**	3 1/4 **82.55**	3.125 **79.38**	330,500 **147,000**	938,400 **417,400**	30,800 **41,700**	38,900 p **52,700**	23,350 **31,660**	0.585 **7.262**	0.290 **3.600**
			16.79 **24.99**	IEU-E75	NC38 (3 1/2 IF)	5 **127.00**	2 11/16 **68.26**	2.563 **65.10**	330,500 **147,000**	587,300 **261,200**	30,800 **41,700**	18,300 p **24,800**	11,000 **14,920**	0.574 **7.135**	0.266 **3.307**
			18.33 **27.28**	IEU-X95	4 1/2 FH	6 **152.40**	2 3/4 **69.85**	2.625 **66.68**	418,700 **186,200**	1,111,600 **494,400**	39,000 **52,900**	39,700 p **53,800**	23,840 **32,320**	0.576 **7.147**	0.299 **3.714**
			18.33 **27.28**	IEU-X95	4 1/2 FH	6 **152.40**	3 **76.20**	2.875 **73.03**	418,700 **186,200**	976,100 **434,200**	39,000 **52,900**	34,700 p **47,100**	20,860 **28,290**	0.580 **7.202**	0.295 **3.659**
			18.79 **27.96**	IEU-X95	NC46 (4 IF)	6 1/4 **158.75**	3 **76.20**	2.875 **73.03**	418,700 **186,200**	1,048,400 **466,300**	39,000 **52,900**	39,600 p **53,700**	23,790 **32,260**	0.580 **7.202**	0.304 **3.776**
			18.79 **27.96**	IEU-X95	NC46 (4 IF)	6 1/4 **158.75**	3 1/4 **82.55**	3.125 **79.38**	418,700 **186,200**	901,100 **400,800**	39,000 **52,900**	33,900 p **46,000**	20,390 **27,650**	0.585 **7.262**	0.299 **3.716**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
4 1/2	3.826	16.60	18.36	EU-X95	NC50 (4 1/2 IF)	6 5/8	3 3/4	3.625	418,700	939,000	39,000	37,600 p	22,830	0.595	0.303
114.3	**97.18**	**24.70**	**27.32**			**168.28**	**95.25**	**92.08**	**186,200**	**417,700**	**52,900**	**51,000**	**30,960**	**7.395**	**3.767**
			18.11	IEU-X95	4 1/2 H90	6	3	2.875	418,700	1,085,600	39,000	45,100 p	27,090	0.580	0.295
			26.95			**152.40**	**76.20**	**73.03**	**186,200**	**482,900**	**52,900**	**61,200**	**36,730**	**7.202**	**3.659**
			18.11	IEU-X95	4 1/2 H90	6	3 1/4	3.125	418,700	938,400	39,000	38,900 p	23,350	0.585	0.290
			26.95			**152.40**	**82.55**	**79.38**	**186,200**	**417,400**	**52,900**	**52,700**	**31,660**	**7.262**	**3.600**
			18.33	IEU-G105	4 1/2 FH	6	2 3/4	2.625	462,700	1,111,600	43,100	39,700 p	23,840	0.576	0.299
			27.28			**152.40**	**69.85**	**66.68**	**205,800**	**494,400**	**58,400**	**53,800**	**32,320**	**7.147**	**3.714**
			18.33	IEU-G105	4 1/2 FH	6	3	2.875	462,700	976,100	43,100	34,700 p	20,860	0.580	0.295
			27.28			**152.40**	**76.20**	**73.03**	**205,800**	**434,200**	**58,400**	**47,100**	**28,290**	**7.202**	**3.659**
			18.79	IEU-G105	NC46 (4 IF)	6 1/4	3	2.875	462,700	1,048,400	43,100	39,600 p	23,790	0.580	0.304
			27.96			**158.75**	**76.20**	**73.03**	**205,800**	**466,300**	**58,400**	**53,700**	**32,260**	**7.202**	**3.776**
			18.36	EU-G105	NC50 (4 1/2 IF)	6 5/8	3 3/4	3.625	462,700	939,000	43,100	37,600 p	22,830	0.595	0.303
			27.32			**168.28**	**95.25**	**92.08**	**205,800**	**417,700**	**58,400**	**51,000**	**30,960**	**7.395**	**3.767**
			18.33	IEU-G105	4 1/2 H90	6	3	2.875	462,700	1,085,600	43,100	45,100 p	27,090	0.580	0.295
			27.28			**152.40**	**76.20**	**73.03**	**205,800**	**482,900**	**58,400**	**61,200**	**36,730**	**7.202**	**3.659**
			19.00	IEU-S135	NC46 (4 IF)	6 1/4	2 3/4	2.625	595,000	1,183,900	55,400	44,800 p	26,920	0.576	0.308
			28.28			**158.75**	**69.85**	**66.68**	**264,600**	**526,600**	**75,100**	**60,800**	**36,500**	**7.147**	**3.831**
			18.79	IEU-S135	NC46 (4 IF)	6 1/4	3	2.875	595,000	1,048,400	55,400	39,600 p	23,790	0.580	0.304
			27.96			**158.75**	**76.20**	**73.03**	**264,600**	**466,300**	**75,100**	**53,700**	**32,260**	**7.202**	**3.776**
			18.62	IEU-S135	NC50 (4 1/2 IF)	6 5/8	3 1/2	3.375	595,000	1,109,900	55,400	44,600 p	27,070	0.590	0.309
			27.71			**168.28**	**88.90**	**85.73**	**264,600**	**493,700**	**75,100**	**60,500**	**36,710**	**7.326**	**3.836**
			19.19	IEU-S135	4 1/2 FH	6 1/4	2 1/2	2.375	595,000	1,235,300	55,400	44,700 p	26,860	0.571	0.312
			28.56			**158.75**	**63.50**	**60.33**	**264,600**	**549,500**	**75,100**	**60,600**	**36,410**	**7.097**	**3.881**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
4 1/2 **114.3**	3.826 **97.18**	16.60 **24.70**	18.33 **27.28**	IEU-S135	4 1/2 H90	6 **152.40**	3 **76.20**	2.875 **73.03**	595,000 **264,600**	1,085,600 **482,900**	55,400 **75,100**	45,100 p **61,200**	27,090 **36,730**	0.580 **7.202**	0.295 **3.659**
	3.640 **92.46**	20.00 **29.76**	21.64 **32.20**	IEU-E75	4 1/2 FH	6 **152.40**	3 **76.20**	2.875 **73.03**	412,300 **183,400**	976,100 **434,200**	36,900 **50,000**	34,700 p **47,100**	20,860 **28,290**	0.528 **6.552**	0.347 **4.310**
			22.33 **33.23**	IEU-E75	NC46 (4 IF)	6 1/4 **158.75**	2 3/4 **69.85**	2.625 **66.68**	412,300 **183,400**	1,183,900 **526,600**	36,900 **50,000**	44,800 p **60,800**	26,920 **36,500**	0.523 **6.497**	0.361 **4.482**
			22.09 **32.87**	IEU-E75	NC46 (4 IF)	6 1/4 **158.75**	3 **76.20**	2.875 **73.03**	412,300 **183,400**	1,048,400 **466,300**	36,900 **50,000**	39,600 p **53,700**	23,790 **32,260**	0.528 **6.552**	0.356 **4.427**
			21.59 **32.13**	IEU-E75	NC50 (4 1/2 IF)	6 5/8 **168.28**	3 5/8 **92.08**	3.500 **88.90**	412,300 **183,400**	1,025,900 **456,300**	36,900 **50,000**	41,200 p **55,900**	24,990 **33,880**	0.540 **6.710**	0.359 **4.453**
			21.64 **32.20**	IEU-E75	4 1/2 H90	6 **152.40**	3 **76.20**	2.875 **73.03**	412,300 **183,400**	1,085,600 **482,900**	36,900 **50,000**	45,100 p **61,200**	27,090 **36,730**	0.528 **6.552**	0.347 **4.310**
			22.39 **33.32**	IEU-X95	4 1/2 FH	6 **152.40**	2 1/2 **63.50**	2.375 **60.33**	522,300 **232,300**	1,235,300 **549,500**	46,700 **63,300**	44,200 p **60,000**	26,550 **36,000**	0.519 **6.447**	0.355 **4.415**
			22.67 **33.74**	IEU-X95	NC46 (4 IF)	6 1/4 **158.75**	2 3/4 **69.85**	2.625 **66.68**	522,300 **232,300**	1,183,900 **526,600**	46,700 **63,300**	44,800 p **60,800**	26,920 **36,500**	0.523 **6.497**	0.361 **4.482**
			22.08 **32.86**	EU-X95	NC50 (4 1/2 IF)	6 5/8 **168.28**	3 1/2 **88.90**	3.375 **85.73**	522,300 **232,300**	1,109,900 **493,700**	46,700 **63,300**	44,600 p **60,500**	27,070 **36,710**	0.538 **6.676**	0.361 **4.487**
			21.78 **32.41**	IEU-X95	4 1/2 H90	6 **152.40**	3 **76.20**	2.875 **73.03**	522,300 **232,300**	1,085,600 **482,900**	46,700 **63,300**	45,100 p **61,200**	27,090 **36,730**	0.528 **6.552**	0.347 **4.310**
			21.78 **32.41**	IEU-X95	4 1/2 H90	6 **152.40**	3 1/4 **82.55**	3.125 **79.38**	522,300 **232,300**	938,400 **417,400**	46,700 **63,300**	38,900 p **52,700**	23,350 **31,660**	0.532 **6.611**	0.342 **4.250**
			22.39 **33.32**	IEU-G105	4 1/2 FH	6 **152.40**	2 1/2 **63.50**	2.375 **60.33**	577,300 **256,700**	1,235,300 **549,500**	51,600 **70,000**	44,200 p **60,000**	26,550 **36,000**	0.519 **6.447**	0.355 **4.415**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
4 1/2	3.640	20.00	22.00	IEU-G105	4 1/2 H90	6	3	2.875	577,300	1,085,600	51,600	45,100 p	27,090	0.528	0.347
114.3	**92.46**	**29.76**	**32.74**			**152.40**	**76.20**	**73.03**	**256,700**	**482,900**	**70,000**	**61,200**	**36,730**	**6.552**	**4.310**
			22.86	IEU-G105	NC46 (4 IF)	6 1/4	2 1/2	2.375	577,300	1,307,600	51,600	49,600 p	29,770	0.519	0.365
			34.02			**158.75**	**63.50**	**60.33**	**256,700**	**581,600**	**70,000**	**67,200**	**40,370**	**6.447**	**4.532**
			22.08	EU-G105	NC50 (4 1/2 IF)	6 5/8	3 1/2	3.375	577,300	1,109,900	51,600	44,600 p	27,070	0.538	0.361
			32.86			**168.28**	**88.90**	**85.73**	**256,700**	**493,700**	**70,000**	**60,500**	**36,710**	**6.676**	**4.487**
			23.03	EU-S135	NC50 (4 1/2 IF)	6 5/8	2 7/8	2.750	742,200	1,485,400	66,400	60,600 p	36,390	0.525	0.374
			34.27			**168.28**	**73.03**	**69.85**	**330,100**	**660,700**	**90,000**	**82,200**	**49,340**	**6.524**	**4.639**
			23.03	EU-S135	NC50 (4 1/2 IF)	6 5/8	3	2.875	742,200	1,416,200	66,400	57,800 p	34,680	0.528	0.371
			34.27			**168.28**	**76.20**	**73.03**	**330,100**	**629,900**	**90,000**	**78,300**	**47,010**	**6.552**	**4.611**
			23.03	IEU-S135	NC46 (4 IF)	6 1/4	2 1/4	2.125	742,200	1,419,500	66,400	53,900 p	32,360	0.515	0.369
			34.27			**158.75**	**57.15**	**53.98**	**330,100**	**631,400**	**90,000**	**73,100**	**43,870**	**6.401**	**4.577**
			22.62	IEU-S135	NC46 (4 IF)	6 1/4	2 3/4	2.625	742,200	1,183,900	66,400	44,800 p	26,920	0.523	0.361
			33.66			**158.75**	**69.85**	**66.68**	**330,100**	**526,600**	**90,000**	**60,800**	**36,500**	**6.497**	**4.482**
	3.500	22.82	24.11	EU-E75	NC50 (4 1/2 IF)	6 5/8	3 5/8	3.500	471,200	1,025,900	40,900	41,600 p	24,990	0.503	0.396
	88.90	**33.96**	**35.88**			**168.28**	**92.08**	**88.90**	**209,600**	**456,300**	**55,400**	**56,400**	**33,880**	**6.241**	**4.921**
			24.56	IEU-E75	NC46 (4 IF)	6 1/4	3	2.875	471,200	1,048,400	40,900	39,600 p	23,790	0.490	0.394
			36.55			**158.75**	**76.20**	**73.03**	**209,600**	**466,300**	**55,400**	**53,700**	**32,260**	**6.083**	**4.895**
			25.13	IEU-X95	4 1/2 FH	6 1/4	2 1/4	2.125	596,900	1,347,200	51,800	48,900 p	29,340	0.478	0.406
			37.40			**158.75**	**57.15**	**53.98**	**265,500**	**599,200**	**70,200**	**66,300**	**39,780**	**5.933**	**5.045**
			24.24	EU-X95	NC50 (4 1/2 IF)	6 5/8	3 1/2	3.375	596,900	1,109,900	51,800	45,100 p	27,070	0.500	0.399
			36.07			**168.28**	**88.90**	**85.73**	**265,500**	**493,700**	**70,200**	**61,100**	**36,710**	**6.207**	**4.955**
			24.77	IEU-X95	NC46 (4 IF)	6 1/4	2 3/4	2.625	596,900	1,183,900	51,800	44,800 p	26,920	0.485	0.399
			36.86			**158.75**	**69.85**	**66.68**	**265,500**	**526,600**	**70,200**	**60,800**	**36,500**	**6.028**	**4.950**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
4 1/2	3.500	22.82	24.72	EU-G105	NC50 (4 1/2 IF)	6 5/8	3 1/4	3.125	659,700	1,268,900	57,200	51,700 p	31,020	0.495	0.404
114.3	**88.90**	**33.96**	**36.79**			**168.28**	**82.55**	**79.38**	**293,400**	**564,400**	**77,600**	**70,100**	**42,060**	**6.143**	**5.020**
			24.96	IEU-G105	NC46 (4 IF)	6 1/4	2 1/2	2.375	659,700	1,307,600	57,200	49,600 p	29,770	0.481	0.403
			37.14			**158.75**	**63.50**	**60.33**	**293,400**	**581,600**	**77,600**	**67,200**	**40,370**	**5.978**	**5.000**
			25.41	EU-S135	NC50 (4 1/2 IF)	6 5/8	2 3/4	2.625	848,200	1,551,700	73,600	63,400 p	38,040	0.485	0.413
			37.81			**168.28**	**69.85**	**66.68**	**377,300**	**690,200**	**99,800**	**85,900**	**51,580**	**6.028**	**5.134**
5	4.276	19.50	22.28	IEU-E75	5 1/2 FH	7	3 3/4	3.625	395,500	1,448,400	41,100	62,900 b	37,740	0.733	0.361
127.0	**108.61**	**29.02**	**33.16**			**177.80**	**95.25**	**92.08**	**175,900**	**644,200**	**55,800**	**85,200**	**51,170**	**9.104**	**4.479**
			20.89	IEU-E75	NC50 (5 XH)	6 3/8	3 3/4	3.625	395,500	939,000	41,100	37,600 p	22,600	0.733	0.335
			31.09			**161.93**	**95.25**	**92.08**	**175,900**	**417,700**	**55,800**	**51,000**	**30,640**	**9.104**	**4.160**
			20.85	IEU-E75	NC50 (5 XH)	6 5/8	3 3/4	3.625	395,500	939,000	41,100	38,000 p	22,830	0.733	0.345
			31.03			**168.28**	**95.25**	**92.08**	**175,900**	**417,700**	**55,800**	**51,600**	**30,960**	**9.104**	**4.284**
			22.62	IEU-X95	5 1/2 FH	7	3 3/4	3.625	501,000	1,448,400	52,100	62,903 b	37,740	0.733	0.361
			33.66			**177.80**	**95.25**	**92.08**	**222,800**	**644,200**	**70,600**	**85,285**	**51,170**	**9.104**	**4.479**
			22.50	IEU-X95	NC50 (5 XH)	6 5/8	3	2.875	501,000	1,416,200	52,100	57,800 p	34,680	0.717	0.361
			33.48			**168.28**	**76.20**	**73.03**	**222,800**	**629,900**	**70,600**	**78,300**	**47,010**	**8.911**	**4.478**
			21.93	IEU-X95	5 H90	6 1/2	3 1/4	3.125	501,000	1,176,200	52,100	51,800 p	31,080	0.722	0.351
			32.64			**165.10**	**82.55**	**79.38**	**222,800**	**523,200**	**70,600**	**70,200**	**42,140**	**8.970**	**4.355**
			21.45	IEU-X95	NC50 (4 1/2 IF)	6 5/8	3 1/2	3.375	501,000	1,109,900	52,100	44,600 p	27,070	0.727	0.351
			31.92			**168.28**	**88.90**	**85.73**	**222,800**	**493,700**	**70,600**	**60,500**	**36,710**	**9.035**	**4.354**
			22.62	IEU-G105	5 1/2 FH	7	3 3/4	3.625	553,800	1,448,400	57,600	62,900 b	37,740	0.733	0.361
			33.66			**177.80**	**95.25**	**92.08**	**246,300**	**644,200**	**78,100**	**85,200**	**51,170**	**9.104**	**4.479**
			22.50	IEU-G105	NC50 (4 1/2 IF)	6 5/8	3	2.875	553,800	1,416,200	57,600	57,800 p	34,680	0.717	0.361
			33.48			**168.28**	**76.20**	**73.03**	**246,300**	**629,900**	**78,100**	**78,300**	**47,010**	**8.911**	**4.478**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
5 **127.0**	4.276 **108.61**	19.50 **29.02**	21.93 **32.64**	IEU-G105	NC50 (4 1/2 IF)	6 5/8 **168.28**	3 1/4 **82.55**	3.125 **79.38**	553,800 **246,300**	1,268,900 **564,400**	57,600 **78,100**	51,400 p **69,700**	31,020 **42,060**	0.722 **8.970**	0.356 **4.418**
			22.15 **32.96**	IEU-G105	5 H90	6 1/2 **165.10**	3 **76.20**	2.875 **73.03**	553,800 **246,300**	1,323,500 **588,700**	57,600 **78,100**	58,300 p **79,100**	35,030 **47,500**	0.717 **8.911**	0.355 **4.415**
			20.89 **31.09**	IEU-S135	NC50 (4 1/2 IF)	6 3/8 **161.93**	3 1/2 **88.90**	3.375 **85.73**	712,000 **316,700**	1,109,900 **493,700**	74,100 **100,400**	44,600 p **60,500**	26,800 **36,340**	0.727 **9.035**	0.341 **4.230**
			22.61 **33.65**	IEU-S135	NC50 (4 1/2 IF)	6 5/8 **168.28**	2 3/4 **69.85**	2.625 **66.68**	712,000 **316,700**	1,551,700 **690,200**	74,100 **100,400**	63,400 p **85,900**	38,040 **51,580**	0.713 **8.856**	0.365 **4.532**
			22.50 **33.48**	IEU-S135	NC50 (4 1/2 IF)	6 5/8 **168.28**	3 **76.20**	2.875 **73.03**	712,000 **316,700**	1,416,200 **629,900**	74,100 **100,400**	57,800 p **78,300**	34,680 **47,010**	0.717 **8.911**	0.361 **4.478**
			22.83 **33.97**	IEU-S135	NC50 (4 1/2 IF)	6 3/4 **171.45**	3 **76.20**	2.875 **73.03**	712,000 **316,700**	1,416,200 **629,900**	74,100 **100,400**	58,000 p **78,700**	34,850 **47,250**	0.717 **8.911**	0.366 **4.541**
			23.48 **34.94**	IEU-S135	5 1/2 FH	7 1/4 **184.15**	3 1/2 **88.90**	3.375 **85.73**	712,000 **316,700**	1,619,200 **720,200**	74,100 **100,400**	72,600 p **98,400**	43,490 **58,960**	0.727 **9.035**	0.377 **4.684**
	4.000 **101.60**	25.60 **38.10**	27.91 **41.53**	IEU-E75	NC50 (4 1/2 IF)	6 5/8 **168.28**	3 **76.20**	2.875 **73.03**	530,100 **235,800**	1,416,200 **629,900**	52,200 **70,800**	57,800 p **78,300**	34,680 **47,020**	0.631 **7.840**	0.447 **5.548**
			26.85 **39.96**	IEU-E75	NC50 (4 1/2 IF)	6 5/8 **168.28**	3 1/2 **88.90**	3.375 **85.73**	530,100 **235,800**	1,109,900 **493,700**	52,200 **70,800**	44,600 p **60,500**	27,070 **36,710**	0.641 **7.964**	0.437 **5.424**
			28.27 **42.07**	IEU-E75	5 1/2 FH	7 **177.80**	3 1/2 **88.90**	3.375 **85.73**	530,100 **235,800**	1,619,200 **720,200**	52,200 **70,800**	60,300 b **81,800**	37,740 **51,170**	0.641 **7.964**	0.452 **5.619**
			27.87 **41.48**	IEU-X95	NC50 (4 1/2 IF)	6 5/8 **168.28**	3 **76.20**	2.875 **73.03**	671,500 **298,700**	1,416,200 **629,900**	66,100 **89,700**	57,800 b **78,300**	34,680 **47,010**	0.631 **7.840**	0.447 **5.548**
			28.59 **42.55**	IEU-X95	5 1/2 FH	7 **177.80**	3 1/2 **88.90**	3.375 **85.73**	671,500 **298,700**	1,619,200 **720,200**	66,100 **89,700**	60,300 b **81,800**	37,740 **51,170**	0.641 **7.964**	0.452 **5.619**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
5	4.000	25.60	28.32	IEU-G105	NC50 (4 1/2 IF)	6 5/8	2 3/4	2.625	742,200	1,551,700	73,100	63,400 b	38,040	0.627	0.451
127.0	**101.60**	**38.10**	**42.14**			**168.28**	**69.85**	**66.68**	**330,100**	**690,200**	**99,100**	**85,900**	**51,580**	**7.786**	**5.603**
			28.24	IEU-G105	NC50 (4 1/2 IF)	6 5/8	3	2.875	742,200	1,416,200	73,100	57,800 p	34,680	0.631	0.447
			42.03			**168.28**	**76.20**	**73.03**	**330,100**	**629,900**	**99,100**	**78,300**	**47,010**	**7.840**	**5.548**
			29.16	IEU-G105	5 1/2 FH	7 1/4	3 1/2	3.375	742,200	1,619,200	73,100	72,600 p	43,490	0.641	0.463
			43.39			**184.15**	**88.90**	**85.73**	**330,100**	**720,200**	**99,100**	**98,400**	**58,960**	**7.964**	**5.755**
			29.43	IEU-S135	5 1/2 FH	7 1/4	3 1/4	3.125	954,200	1,778,200	94,000	76,100 b	47,230	0.636	0.469
			43.80			**184.15**	**82.55**	**79.38**	**424,400**	**791,000**	**127,500**	**103,200**	**64,030**	**7.900**	**5.819**
			28.24	IEU-S135	NC50 (4 1/2 IF)	6 5/8	3	2.875	954,200	1,416,200	94,000	57,800 p	34,680	0.631	0.447
			42.03			**168.28**	**76.20**	**73.03**	**424,400**	**629,900**	**127,500**	**78,300**	**47,010**	**7.840**	**5.548**
5 1/2	4.778	21.90	23.78	IEU-E75	5 1/2 FH	7	4	3.875	437,100	1,265,800	50,700	56,000 p	33,560	0.910	0.381
139.7	**121.36**	**32.59**	**35.39**			**177.80**	**101.60**	**98.43**	**194,400**	**563,000**	**68,700**	**75,900**	**45,500**	**11.307**	**4.736**
			24.53	IEU-X95	5 1/2 FH	7	3 3/4	3.625	553,600	1,448,400	64,200	60,300 b	37,740	0.905	0.387
			36.50			**177.80**	**95.25**	**92.08**	**246,200**	**644,200**	**87,000**	**81,800**	**51,170**	**11.233**	**4.810**
			25.86	IEU-X95	5 1/2 FH	7 1/2	3 1/2	3.375	546,500	1,619,200	63,500	73,100 p	43,880	0.903	0.411
			38.48			**190.50**	**88.90**	**85.73**	**243,100**	**720,200**	**86,100**	**99,100**	**59,500**	**11.209**	**5.110**
			24.80	IEU-X95	5 1/2 H90	7	3 1/2	3.375	553,600	1,268,800	64,200	59,000 p	35,450	0.899	0.393
			36.91			**177.80**	**88.90**	**85.73**	**246,200**	**564,400**	**87,000**	**80,100**	**48,060**	**11.164**	**4.879**
			25.38	IEU-G105	5 1/2 FH	7 1/4	3 1/2	3.375	611,900	1,619,200	70,900	72,400 p	43,490	0.899	0.404
			37.77			**184.15**	**88.90**	**85.73**	**272,200**	**720,200**	**96,200**	**98,200**	**58,960**	**11.164**	**5.015**
			25.26	IEU-S135	5 1/2 FH	7 1/4	3 1/2	3.375	786,800	1,619,200	90,200	72,400 p	43,490	0.903	0.400
			37.59			**184.15**	**88.90**	**85.73**	**349,900**	**720,200**	**122,300**	**98,200**	**58,960**	**11.209**	**4.970**
			26.50	IEU-S135	5 1/2 FH	7 1/2	3	2.875	786,800	1,925,500	91,200	87,300 p	52,300	0.889	0.425
			39.44			**190.50**	**76.20**	**73.03**	**349,900**	**856,500**	**123,700**	**118,400**	**70,910**	**11.040**	**5.279**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
5 1/2	4.778	21.90	25.86	IEU-S135	5 1/2 FH	7 1/2	3 1/2	3.375	786,800	1,619,200	90,200	73,100 p	43,880	0.903	0.411
139.7	**121.36**	**32.59**	**38.48**			**190.50**	**88.90**	**85.73**	**349,900**	**720,200**	**122,300**	**99,100**	**59,500**	**11.209**	**5.110**
	4.670	24.70	26.30	IEU-E75	5 1/2 FH	7	4	3.875	497,200	1,265,800	56,500	56,000 p	33,560	0.872	0.420
	118.62	**36.76**	**39.14**			**177.80**	**101.60**	**98.43**	**221,100**	**563,000**	**76,700**	**75,900**	**45,500**	**10.829**	**5.214**
			27.18	IEU-X95	5 1/2 FH	7	3 1/2	3.375	629,800	1,619,200	71,600	62,900 b	37,740	0.860	0.431
			40.45			**177.80**	**88.90**	**85.73**	**280,100**	**720,200**	**97,100**	**85,200**	**51,170**	**10.686**	**5.357**
			27.85	IEU-X95	5 1/2 FH	7 1/4	3 1/2	3.375	629,800	1,619,200	71,600	72,600 p	43,490	0.860	0.442
			41.45			**184.15**	**88.90**	**85.73**	**280,100**	**720,200**	**97,100**	**98,400**	**58,960**	**10.686**	**5.493**
			28.34	IEU-X95	5 1/2 FH	7 1/2	3 1/2	3.375	629,800	1,619,200	71,600	73,100 p	43,880	0.860	0.454
			42.17			**190.50**	**88.90**	**85.73**	**280,100**	**720,200**	**97,100**	**99,100**	**59,500**	**10.686**	**5.633**
			27.85	IEU-G105	5 1/2 FH	7 1/4	3 1/2	3.375	696,100	1,619,200	79,200	72,600 p	43,490	0.860	0.442
			41.45			**184.15**	**88.90**	**85.73**	**309,600**	**720,200**	**107,300**	**98,400**	**58,960**	**10.686**	**5.493**
			27.77	IEU-S135	5 1/2 FH	7 1/2	3	2.875	894,900	1,925,500	101,800	87,300 p	52,300	0.850	0.464
			41.33			**190.50**	**76.20**	**73.03**	**398,100**	**856,500**	**138,000**	**118,400**	**70,910**	**10.562**	**5.757**
			28.34	IEU-S135	5 1/2 FH	7 1/2	3 1/2	3.375	894,900	1,619,200	101,800	73,100 p	43,880	0.860	0.454
			42.17			**190.50**	**88.90**	**85.73**	**398,100**	**720,200**	**138,000**	**99,100**	**59,500**	**10.686**	**5.633**
6 5/8	5.965	25.20	27.28	IEU-E75	6 5/8 FH	8	5	4.875	489,400	1,447,600	70,500	73,600 p	44,190	1.419	0.433
169.3	**151.51**	**37.50**	**40.60**			**203.20**	**127.00**	**123.83**	**217,700**	**643,900**	**95,600**	**99,800**	**59,920**	**17.626**	**5.381**
			27.15	IEU-X95	6 5/8 FH	8	5	4.875	619,900	1,448,400	89,400	73,600 p	44,190	1.419	0.433
			40.40			**203.20**	**127.00**	**123.83**	**275,700**	**644,200**	**121,200**	**99,800**	**59,920**	**17.626**	**5.381**
			28.20	IEU-G105	6 5/8 FH	8 1/4	4 3/4	4.625	685,200	1,678,100	98,800	86,200 p	51,740	1.412	0.453
			41.97			**209.55**	**120.65**	**117.48**	**304,800**	**746,400**	**133,900**	**116,900**	**70,150**	**17.533**	**5.629**
			27.55	IEU-S135	6 5/8 FH	8	5	4.875	881,000	1,448,400	127,000	73,600 p	44,190	1.419	0.433
			41.00			**203.20**	**127.00**	**123.83**	**391,900**	**644,200**	**172,200**	**99,800**	**59,920**	**17.626**	**5.381**

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NEW DRILL PIPE & NEW TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data					New Tool Joint Data			Drift Dia.	Mechanical Properties				Make-Up Torque	Cap. With Tool Joint	Disp. With Tool Joint
									Tensile Yield		Torsional Yield				
Nom. Size	I.D.	Nom. Weight	Approx. Weight	Material Type/ Upset	Connection	O.D.	I.D.		Pipe	Tool Joint	Pipe	Tool Joint			
in. **mm**	in **mm**	lb/ft **kg/m**	lb/ft **kg/m**			in **mm**	in **mm**	in **mm**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	ft-lb **N.m**	U.S.gal/ft **Liter/m**	U.S.gal/ft **Liter/m**
6 5/8	5.965	25.20	29.63	IEU-S135	6 5/8 FH	8 1/2	4 1/4	4.125	881,000	2,102,200	127,000	109,200 p	65,530	1.398	0.480
169.3	**151.51**	**37.50**	**44.09**			**215.90**	**107.95**	**104.78**	**391,900**	**935,100**	**172,200**	**148,000**	**88,850**	**17.361**	**5.960**
	5.901	27.70	29.06	IEU-E75	6 5/8 FH	8	5	4.875	534,100	1,447,600	76,200	73,600 p	44,190	1.391	0.462
	149.89	**41.22**	**43.25**			**203.20**	**127.00**	**123.83**	**237,600**	**643,900**	**103,400**	**99,800**	**59,920**	**17.270**	**5.737**
			30.11	IEU-X95	6 5/8 FH	8 1/4	4 3/4	4.625	676,600	1,678,100	96,600	86,200 p	51,740	1.383	0.482
			44.81			**209.55**	**120.65**	**117.48**	**300,900**	**746,400**	**131,000**	**116,900**	**70,150**	**17.177**	**5.985**
			29.77	IEU-G105	6 5/8 FH	8	4 3/4	4.625	747,800	1,678,100	106,800	85,500 p	51,320	1.383	0.469
			44.30			**203.20**	**120.65**	**117.48**	**332,600**	**746,400**	**144,800**	**115,900**	**69,590**	**17.177**	**5.830**
			30.11	IEU-G105	6 5/8 FH	8 1/4	4 3/4	4.625	747,200	1,678,100	106,800	86,200 p	51,740	1.383	0.482
			44.81			**209.55**	**120.65**	**117.48**	**332,300**	**746,400**	**144,800**	**116,900**	**70,150**	**17.177**	**5.985**
			30.45	IEU-S135	6 5/8 FH	8	4 1/4	4.125	961,500	2,102,200	137,300	87,800 b	52,710	1.369	0.483
			45.31			**203.20**	**107.95**	**104.78**	**427,700**	**935,100**	**186,100**	**119,100**	**71,470**	**17.005**	**6.001**
			31.54	IEU-S135	6 5/8 FH	8 1/2	4 1/4	4.125	961,500	2,102,200	137,300	109,200 p	65,530	1.369	0.509
			46.94			**215.90**	**107.95**	**104.78**	**427,700**	**935,100**	**186,100**	**148,000**	**88,850**	**17.005**	**6.316**

FOR REFERENCE SEE TABLE 1, 8, 9 & 10 (API RP7G, 16th EDITION)
p=pin limited yield, b=box limited yield

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
2 3/8 **60.33**	1.995 **50.67**	4.85 **7.22**	EU-E75	NC26(2 3/8 IF)	3 1/8 **79.38**	1 3/4 **44.45**	1,900 **2,600**	76,800 **34,200**	313,600 **139,500**	3,700 **5,000**	3,200 **4,300**
			EU-E75	2 3/8 WO	3 1/16 **77.79**	2 **50.80**	1,900 **2,700**	76,800 **34,200**	195,600 **87,000**	3,700 **5,000**	3,300 **4,500**
			EU-E75	2 3/8 OHLW	3 **76.20**	2 **50.80**	1,800 **2,400**	76,800 **34,200**	206,200 **91,700**	3,700 **5,000**	3,000 **4,100**
			EU-E75	2 3/8 SL-H90	2 31/32 **75.41**	2 **50.80**	1,900 **2,700**	76,800 **34,200**	202,800 **90,200**	3,700 **5,000**	3,300 **4,500**
	1.815 **46.10**	6.65 **9.90**	IU-E75	2 3/8 PAC	2 25/32 **70.64**	1 3/8 **34.93**	2,400 **3,300**	107,600 **47,800**	238,500 **106,000**	4,800 **6,500**	4,000 **5,500**
			IU-E75	2 3/8 PAC	2 3/4 **69.85**	1 3/8 **34.93**	2,200 **3,000**	107,600 **47,800**	238,500 **106,000**	4,800 **6,500**	3,700 **5,000**
			EU-E75	NC26(2 3/8 IF)	3 9/32 **83.34**	1 3/4 **44.45**	3,200 **4,400**	107,600 **47,800**	313,600 **139,500**	4,800 **6,500**	5,400 **7,400**
			EU-E75	NC26(2 3/8 IF)	3 1/4 **82.55**	1 3/4 **44.45**	3,000 **4,000**	107,600 **47,800**	313,600 **139,500**	4,800 **6,500**	5,000 **6,700**
			EU-E75	NC26(2 3/8 IF)	3 3/16 **80.96**	1 3/4 **44.45**	2,400 **3,300**	107,600 **47,800**	313,600 **139,500**	4,800 **6,500**	4,100 **5,500**
			EU-E75	2 3/8 SL-H90	3 1/32 **76.99**	2 **50.80**	2,500 **3,400**	107,600 **47,800**	202,800 **90,200**	4,800 **6,500**	4,200 **5,700**
			EU-E75	2 3/8 SL-H90	3 1/32 **76.99**	1 13/16 **46.04**	2,500 **3,400**	107,600 **47,800**	270,200 **120,200**	4,800 **6,500**	4,200 **5,700**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
2 3/8 **60.33**	1.815 **46.10**	6.65 **9.90**	EU-E75	2 3/8 SL-H90	3 1/32 **76.99**	1 3/4 **44.45**	2,500 **3,400**	107,600 **47,800**	291,200 **129,500**	4,800 **6,500**	4,200 **5,700**
			EU-E75	2 3/8 OHSW	3 1/16 **77.79**	1 3/4 **44.45**	2,300 **3,100**	107,600 **47,800**	294,600 **131,000**	4,800 **6,500**	3,800 **5,200**
			EU-X95	NC26(2 3/8 IF)	3 1/4 **82.55**	1 3/4 **44.45**	3,000 **4,000**	136,300 **60,600**	313,600 **139,500**	6,000 **8,200**	5,000 **6,700**
			EU-G105	NC26(2 3/8 IF)	3 9/32 **83.34**	1 3/4 **44.45**	3,200 **4,400**	150,600 **67,000**	313,600 **139,500**	6,700 **9,100**	5,400 **7,400**
			EU-S135	NC26(2 3/8 IF)	3 9/32 **83.34**	1 3/4 **44.45**	3,200 **4,400**	193,700 **86,100**	313,600 **139,500**	8,600 **11,700**	5,400 **7,400**
2 7/8 **73.0**	2.441 **62.00**	6.85 **10.19**	EU-E75	NC31(2 7/8 IF)	3 11/16 **93.66**	2 1/8 **53.98**	3,100 **4,200**	106,900 **47,500**	447,100 **198,800**	6,300 **8,500**	5,200 **7,100**
			EU-E75	2 7/8 WO	3 5/8 **92.08**	2 7/16 **61.91**	3,200 **4,300**	106,900 **47,500**	277,500 **123,400**	6,300 **8,500**	5,300 **7,200**
			EU-E75	2 7/8 OHLW	3 1/2 **88.90**	2 7/16 **61.91**	3,200 **4,400**	106,900 **47,500**	223,700 **99,500**	6,300 **8,500**	5,400 **7,400**
			EU-E75	2 7/8 SL-H90	3 1/2 **88.90**	2 7/16 **61.91**	3,300 **4,600**	106,900 **47,500**	260,900 **116,000**	6,300 **8,500**	5,600 **7,600**
	2.151 **54.64**	10.40 **15.48**	EU-E75	NC31(2 7/8 IF)	3 61/64 **100.41**	2 1/8 **53.98**	6,300 **8,500**	166,500 **74,000**	447,100 **198,800**	8,800 **12,000**	10,500 **14,200**
			EU-E75	NC31(2 7/8 IF)	3 59/64 **99.62**	2 1/8 **53.98**	5,900 **8,000**	166,500 **74,000**	447,100 **198,800**	8,800 **12,000**	9,800 **13,300**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
2 7/8 **73.0**	2.151 **54.64**	10.40 **15.48**	EU-E75	NC31(2 7/8 IF)	3 13/16 **96.84**	2 1/8 **53.98**	4,500 **6,200**	166,500 **74,000**	447,100 **198,800**	8,800 **12,000**	7,600 **10,300**
			IU-E75	2 7/8 XH	3 23/32 **94.46**	1 7/8 **47.63**	4,300 **5,900**	166,500 **74,000**	505,000 **224,600**	8,800 **12,000**	7,200 **9,800**
			IU-E75	NC26(2 3/8 IF)	3 3/8 **85.73**	1 3/4 **44.45**	4,100 **5,500**	166,500 **74,000**	313,600 **139,500**	8,800 **12,000**	6,800 **9,300**
			IU-E75	NC26(2 3/8 IF)	3 9/32 **83.34**	1 3/4 **44.45**	3,200 **4,400**	166,500 **74,000**	313,600 **139,500**	8,800 **12,000**	5,400 **7,400**
			IU-E75	NC26(2 3/8 IF)	3 1/4 **82.55**	1 3/4 **44.45**	3,000 **4,000**	166,500 **74,000**	313,600 **139,500**	8,800 **12,000**	5,000 **6,700**
			EU-E75	2 7/8 OHSW	3 19/32 **91.28**	2 5/32 **54.77**	4,200 **5,700**	166,500 **74,000**	345,500 **153,600**	8,800 **12,000**	7,100 **9,600**
			EU-E75	2 7/8 SL-H90	3 5/8 **92.08**	2 1/8 **53.98**	4,900 **6,600**	166,500 **74,000**	395,300 **175,800**	8,800 **12,000**	8,100 **11,100**
			EU-E75	2 7/8 SL-H90	3 19/32 **91.28**	2 5/32 **54.77**	4,500 **6,100**	166,500 **74,000**	382,700 **170,200**	8,800 **12,000**	7,500 **10,200**
			IU-E75	2 7/8 PAC	3 1/8 **79.38**	1 1/2 **38.10**	3,400 **4,600**	166,500 **74,000**	273,000 **121,400**	8,800 **12,000**	5,700 **7,700**
			IU-E75	2 7/8 PAC	3 **76.20**	1 1/2 **38.10**	3,100 **4,200**	166,500 **74,000**	273,000 **121,400**	8,800 **12,000**	5,200 **7,000**
			EU-X95	NC31(2 7/8 IF)	3 29/32 **99.22**	2 **50.80**	5,700 **7,700**	210,900 **93,800**	495,700 **220,500**	11,200 **15,200**	9,500 **12,900**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
2 7/8 **73.0**	2.151 **54.64**	10.40 **15.48**	EU-X95	NC31(2 7/8 IF)	3 61/64 **100.41**	2 **50.80**	6,300 **8,500**	210,900 **93,800**	495,700 **220,500**	11,200 **15,200**	10,500 **14,200**
			EU-X95	2 7/8 SL-H90	3 5/8 **92.08**	2 5/32 **54.77**	4,900 **6,600**	210,900 **93,800**	382,700 **170,200**	11,200 **15,200**	8,100 **11,100**
			EU-X95	2 7/8 SL-H90	3 11/16 **93.66**	2 5/32 **54.77**	5,700 **7,700**	210,900 **93,800**	382,700 **170,200**	11,200 **15,200**	9,500 **12,800**
			IU-X95	2 7/8 PAC	3 **76.20**	1 1/2 **38.10**	3,100 **4,200**	210,900 **93,800**	273,000 **121,400**	11,200 **15,200**	5,200 **7,000**
			EU-G105	NC31(2 7/8 IF)	3 15/16 **100.01**	2 **50.80**	6,100 **8,200**	233,100 **103,700**	495,700 **220,500**	12,400 **16,800**	10,100 **13,800**
			EU-G105	NC31(2 7/8 IF)	3 61/64 **100.41**	2 **50.80**	6,300 **8,500**	233,100 **103,700**	495,700 **220,500**	12,400 **16,800**	10,500 **14,200**
			IU-G105	2 7/8 PAC	3 **76.20**	1 1/2 **38.10**	3,100 **4,200**	233,100 **103,700**	273,000 **121,400**	12,400 **16,800**	5,200 **7,000**
			EU-S135	NC31(2 7/8 IF)	4 1/16 **103.19**	1 5/8 **41.28**	7,600 **10,400**	299,700 **133,300**	623,800 **277,400**	15,900 **21,600**	12,800 **17,300**
			EU-S135	NC31(2 7/8 IF)	3 61/64 **100.41**	2 **50.80**	6,300 **8,500**	299,700 **133,300**	495,700 **220,500**	15,900 **21,600**	10,500 **14,200**
			IU-S135	2 7/8 PAC	3 **76.20**	1 1/4 **31.75**	3,100 **4,200**	299,700 **133,300**	337,800 **150,200**	15,900 **21,600**	5,200 **7,000**
			IU-S135	2 7/8 PAC	3 **76.20**	1 1/2 **38.10**	3,100 **4,200**	299,700 **133,300**	273,000 **121,400**	15,900 **21,600**	5,200 **7,000**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
2 7/8 **73.0**	2.151 **54.64**	10.40 **15.48**	IU-S135	NC26(2 3/8 IF)	3 9/32 **83.34**	1 3/4 **44.45**	3,200 **4,400**	299,700 **133,300**	313,600 **139,500**	15,900 **21,600**	5,400 **7,400**
			EU-S135	2 7/8 SL-H90	3 5/8 **92.08**	2 1/8 **53.98**	4,900 **6,600**	299,700 **133,300**	395,300 **175,800**	15,900 **21,600**	8,100 **11,100**
3 1/2 **88.9**	2.992 **76.00**	9.50 **14.14**	EU-E75	NC38 (3 1/2 IF)	4 13/32 **111.92**	3 **76.20**	5,700 **7,800**	152,900 **68,000**	419,700 **186,700**	11,900 **16,100**	9,600 **13,000**
			EU-E75	NC38 (3 1/2 IF)	4 13/32 **111.92**	2 11/16 **68.26**	5,700 **7,800**	152,900 **68,000**	587,300 **261,200**	11,000 **15,000**	9,600 **13,000**
			EU-E75	3 1/2 OHLW	4 9/32 **108.74**	3 **76.20**	5,300 **7,200**	152,900 **68,000**	392,000 **174,400**	11,900 **16,100**	8,900 **12,000**
			EU-E75	3 1/2 SL-H90	4 3/16 **106.36**	3 **76.20**	5,500 **7,400**	152,900 **68,000**	366,700 **163,100**	11,900 **16,100**	9,200 **12,400**
	2.764 **70.21**	13.30 **19.79**	EU-E75	NC38 (3 1/2 IF)	4 1/2 **114.30**	2 11/16 **68.26**	7,200 **9,800**	212,100 **94,300**	587,300 **261,200**	14,300 **19,400**	12,100 **16,400**
			EU-E75	NC38 (3 1/2 IF)	4 37/64 **116.28**	2 11/16 **68.26**	8,500 **11,600**	212,100 **94,300**	587,300 **261,200**	14,300 **19,400**	14,200 **19,300**
			EU-E75	NC38 (3 1/2 IF)	4 19/32 **116.68**	2 11/16 **68.26**	8,800 **11,900**	212,100 **94,300**	587,300 **261,200**	14,300 **19,400**	14,700 **19,900**
			IU-E75	NC31 (2 7/8 IF)	4 **101.60**	2 1/8 **53.98**	6,800 **9,300**	212,100 **94,300**	447,100 **198,800**	14,300 **19,400**	11,400 **15,500**
			EU-E75	3 1/2 OHSW	4 13/32 **111.92**	2 11/16 **68.26**	7,200 **9,800**	212,100 **94,300**	559,500 **248,900**	14,300 **19,400**	12,100 **16,400**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in.	in	lb/ft			in	in	ft-lb	lb	lb	ft-lb	ft-lb
mm	**mm**	**kg/m**			**mm**	**mm**	**N.m**	**daN**	**daN**	**N.m**	**N.m**
3 1/2	2.764	13.30	EU-E75	3 1/2 H90	4 17/32	2 3/4	7,000	212,100	664,000	14,300	11,700
88.9	**70.21**	**19.79**			**115.09**	**69.85**	**9,500**	**94,300**	**295,300**	**19,400**	**15,900**
			EU-E75	3 1/2 XH	4 3/4	2 7/16	10,200	212,100	570,900	14,300	17,400
					120.65	**61.91**	**13,800**	**94,300**	**253,900**	**19,400**	**23,700**
			E75	3 1/2 SH	3 61/64	2 1/8	6,300	212,100	447,100	14,300	10,500
					100.41	**53.98**	**8,500**	**94,300**	**198,800**	**19,400**	**14,200**
			EU-X95	NC38 (3 1/2 IF)	4 19/32	2 9/16	8,800	268,700	649,100	18,100	14,700
					116.68	**65.09**	**11,900**	**119,500**	**288,700**	**24,600**	**19,900**
			EU-X95	NC38 (3 1/2 IF)	4 19/32	2 11/16	8,800	268,700	587,300	18,100	14,700
					116.68	**68.26**	**11,900**	**119,500**	**261,200**	**24,600**	**19,900**
			EU-X95	NC38 (3 1/2 IF)	4 5/8	2 9/16	9,300	268,700	649,100	18,100	15,500
					117.48	**65.09**	**12,600**	**119,500**	**288,700**	**24,600**	**21,100**
			EU-X95	NC38 (3 1/2 IF)	4 13/16	2 9/16	12,000	268,700	649,100	18,100	20,100
					122.24	**65.09**	**16,300**	**119,500**	**288,700**	**24,600**	**27,200**
			EU-X95	3 1/2 SL-H90	4 3/8	2 11/16	8,700	268,700	534,200	18,100	14,500
					111.13	**68.26**	**11,800**	**119,500**	**237,600**	**24,600**	**19,700**
			EU-X95	3 1/2 H90	4 5/8	2 3/4	8,800	268,700	664,000	18,100	14,700
					117.48	**69.85**	**11,900**	**119,500**	**295,300**	**24,600**	**19,900**
			X95	3 1/2 SH	3 61/64	2 1/8	6,300	268,700	447,100	18,100	10,500
					100.41	**53.98**	**8,500**	**119,500**	**198,800**	**24,600**	**14,200**
			EU-G105	NC38 (3 1/2 IF)	4 19/32	2 11/16	8,800	297,000	587,300	20,100	14,700
					116.68	**68.26**	**11,900**	**132,100**	**261,200**	**27,200**	**19,900**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
3 1/2 **88.9**	2.764 **70.21**	13.30 **19.79**	EU-G105	NC38 (3 1/2 IF)	4 21/32 **118.27**	2 7/16 **61.91**	9,800 **13,300**	297,000 **132,100**	708,000 **314,900**	20,100 **27,200**	16,400 **22,300**
			EU-G105	3 1/2 SL-H90	4 3/4 **120.65**	2 9/16 **65.09**	12,500 **16,900**	297,000 **132,100**	596,000 **265,100**	20,100 **27,200**	20,800 **28,300**
			G105	3 1/2 SH	3 61/64 **100.41**	2 1/8 **53.98**	6,300 **8,500**	297,000 **132,100**	447,100 **198,800**	20,100 **27,200**	10,500 **14,200**
			EU-S135	NC40 (4FH)	5 **127.00**	2 7/16 **61.91**	12,500 **17,000**	381,800 **169,800**	897,100 **399,000**	25,800 **35,000**	20,900 **28,400**
			EU-S135	NC38 (3 1/2 IF)	4 5/8 **117.48**	2 9/16 **65.09**	9,300 **12,600**	381,800 **169,800**	649,100 **288,700**	25,800 **35,000**	15,500 **21,100**
			EU-S135	NC38 (3 1/2 IF)	4 25/32 **121.44**	2 9/16 **65.09**	12,000 **16,300**	381,800 **169,800**	649,100 **288,700**	25,800 **35,000**	20,000 **27,200**
			EU-S135	NC38 (3 1/2 IF)	4 13/16 **122.24**	2 1/8 **53.98**	12,600 **17,100**	381,800 **169,800**	842,400 **374,700**	25,800 **35,000**	21,000 **28,500**
			EU-S135	3 1/2 SL-H90	5 **127.00**	2 1/8 **53.98**	16,800 **22,800**	381,800 **169,800**	789,300 **351,100**	25,800 **35,000**	28,000 **38,000**
			S135	3 1/2 SH	3 61/64 **100.41**	2 1/8 **53.98**	6,300 **8,500**	381,800 **169,800**	447,100 **198,800**	25,800 **35,000**	10,500 **14,200**
	2.602 **66.09**	15.50 **23.07**	EU-E75	NC38 (3 1/2 IF)	4 17/32 **115.09**	2 9/16 **65.09**	7,700 **10,500**	250,600 **111,400**	649,100 **288,700**	16,100 **21,800**	12,900 **17,500**
			EU-E75	NC38 (3 1/2 IF)	4 19/32 **116.68**	2 9/16 **65.09**	8,800 **11,900**	250,600 **111,400**	649,100 **288,700**	16,100 **21,800**	14,700 **19,900**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
3 1/2	2.602	15.50	EU-E75	NC38 (3 1/2 IF)	4 5/8	2 9/16	9,300	250,600	649,100	16,100	15,500
88.9	**66.09**	**23.07**			**117.48**	**65.09**	**12,600**	**111,400**	**288,700**	**21,800**	**21,100**
			EU-E75	NC38 (3 1/2 IF)	4 25/32	2 9/16	12,000	250,600	649,100	16,100	20,000
					121.44	**65.09**	**16,300**	**111,400**	**288,700**	**21,800**	**27,200**
			EU-X95	NC38 (3 1/2 IF)	4 19/32	2 9/16	8,800	317,400	649,100	20,400	14,700
					116.68	**65.09**	**11,900**	**141,200**	**288,700**	**27,700**	**19,900**
			EU-X95	NC38 (3 1/2 IF)	4 5/8	2 9/16	9,300	317,400	649,100	20,400	15,500
					117.48	**65.09**	**12,600**	**141,200**	**288,700**	**27,700**	**21,100**
			EU-X95	NC38(3 1/2 IF)	4 21/32	2 7/16	9,800	317,400	708,000	20,400	16,400
					118.27	**61.91**	**13,300**	**141,200**	**314,900**	**27,700**	**22,300**
			EU-X95	NC38 (3 1/2 IF)	4 13/16	2 9/16	12,000	317,400	649,100	20,400	20,100
					122.24	**65.09**	**16,300**	**141,200**	**288,700**	**27,700**	**27,200**
			X95	3 1/2 SH	3 61/64	2 1/8	6,300	317,400	447,100	20,400	10,500
					100.41	**53.98**	**8,500**	**141,200**	**198,800**	**27,700**	**14,200**
			EU-G105	NC38 (3 1/2 IF)	4 23/32	2 1/8	10,900	350,800	842,400	22,600	18,200
					119.86	**53.98**	**14,800**	**156,000**	**374,700**	**30,600**	**24,700**
			EU-G105	NC38 (3 1/2 IF)	4 5/8	2 9/16	9,300	350,800	649,100	22,600	15,500
					117.48	**65.09**	**12,600**	**156,000**	**288,700**	**30,600**	**21,100**
			EU-G105	NC40 (4 FH)	4 15/16	2 9/16	11,300	350,800	838,200	22,600	18,900
					125.41	**65.09**	**15,400**	**156,000**	**372,800**	**30,600**	**25,600**
			EU-S135	NC40(4FH)	5 3/32	2 1/4	14,400	451,100	979,900	29,000	24,000
					129.38	**57.15**	**19,500**	**200,600**	**435,900**	**39,400**	**32,500**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
3 1/2 **88.9**	2.602 **66.09**	15.50 **23.07**	EU-S135	NC38 (3 1/2 IF)	4 5/8 **117.48**	2 9/16 **65.09**	9,300 **12,600**	451,100 **200,600**	649,100 **288,700**	29,000 **39,400**	15,500 **21,100**
			EU-S135	NC38(3 1/2 IF)	4 45/64 **119.46**	2 7/16 **61.91**	10,600 **14,400**	451,100 **200,600**	708,000 **314,900**	29,000 **39,400**	17,800 **24,100**
			EU-S135	NC38(3 1/2 IF)	4 31/32 **126.21**	2 7/16 **61.91**	13,300 **18,000**	451,100 **200,600**	708,000 **314,900**	29,000 **39,400**	22,100 **30,000**
4 **101.6**	3.476 **88.29**	11.85 **17.63**	EU-E75	NC46 (4 IF)	5 7/32 **132.56**	3 1/4 **82.55**	7,800 **10,600**	182,000 **80,900**	901,100 **400,800**	15,300 **20,700**	13,000 **17,700**
			EU-E75	4 WO	5 7/32 **132.56**	3 7/16 **87.31**	7,800 **10,600**	182,000 **80,900**	782,900 **348,200**	15,300 **20,700**	13,000 **17,700**
			EU-E75	4 OH LW	5 **127.00**	3 15/32 **88.11**	7,800 **10,600**	182,000 **80,900**	621,300 **276,300**	15,300 **20,700**	13,100 **17,700**
			IU-E75	4 H90	4 7/8 **123.83**	2 13/16 **71.44**	7,600 **10,300**	182,000 **80,900**	913,700 **406,400**	15,300 **20,700**	12,700 **17,200**
	3.340 **84.84**	14.00 **20.83**	IU-E75	NC40 (4 FH)	5 1/64 **127.40**	2 13/16 **71.44**	12,800 **17,400**	224,100 **99,700**	711,600 **316,500**	18,100 **24,600**	21,400 **29,000**
			IU-E75	NC40 (4 FH)	4 13/16 **122.24**	2 13/16 **71.44**	9,000 **12,200**	224,100 **99,700**	711,600 **316,500**	18,100 **24,600**	15,000 **20,300**
			EU-E75	NC46 (4 IF)	5 9/32 **134.14**	3 1/4 **82.55**	9,200 **12,500**	224,100 **99,700**	901,100 **400,800**	18,100 **24,600**	15,300 **20,800**
			IU-E75	4 SH* (3 1/2 XH)	4 7/16 **112.71**	2 9/16 **65.09**	8,700 **11,900**	224,100 **99,700**	512,000 **227,700**	18,100 **24,600**	14,600 **19,800**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in.	in	lb/ft			in	in	ft-lb	lb	lb	ft-lb	ft-lb
mm	**mm**	**kg/m**			**mm**	**mm**	**N.m**	**daN**	**daN**	**N.m**	**N.m**
4	3.340	14.00	IU-E75	4 SH (3 1/2 XH)	4 17/32	2 7/16	10,100	224,100	570,900	18,100	16,800
101.6	**84.84**	**20.83**			**115.09**	**61.91**	**13,700**	**99,700**	**253,900**	**24,600**	**22,800**
			EU-E75	4 OHSW	5 1/16	3 1/4	9,100	224,100	759,800	18,100	15,200
					128.59	**82.55**	**12,300**	**99,700**	**338,000**	**24,600**	**20,600**
			IU-E75	4 H90	4 15/16	2 13/16	8,900	224,100	913,700	18,100	14,900
					125.41	**71.44**	**12,100**	**99,700**	**406,400**	**24,600**	**20,300**
			IU-X95	NC40 (4 FH)	4 31/32	2 11/16	11,900	283,900	776,400	23,000	19,900
					126.21	**68.26**	**16,200**	**126,300**	**345,300**	**31,200**	**27,000**
			IU-X95	NC40 (4 FH)	4 15/16	2 11/16	11,300	283,900	776,400	23,000	18,900
					125.41	**68.26**	**15,400**	**126,300**	**345,300**	**31,200**	**25,600**
			IU-X95	NC40 (4 FH)	5 1/4	2 13/16	12,800	283,900	711,600	23,000	21,400
					133.35	**71.44**	**17,400**	**126,300**	**316,500**	**31,200**	**29,000**
			EU-X95	NC46 (4 IF)	5 3/8	3 1/4	11,300	283,900	901,100	23,000	18,900
					136.53	**82.55**	**15,400**	**126,300**	**400,800**	**31,200**	**25,600**
			IU-X95	4 H90	5 1/32	2 13/16	11,000	283,900	913,700	23,000	18,400
					127.79	**71.44**	**15,000**	**126,300**	**406,400**	**31,200**	**25,000**
			X95	4 SH(3 1/2 XH)	4 17/32	2 7/16	10,100	283,900	570,900	23,000	16,800
					115.09	**61.91**	**13,700**	**126,300**	**253,900**	**31,200**	**22,800**
			IU-G105	NC40 (4 FH)	5	2 7/16	12,500	313,800	897,100	25,400	20,900
					127.00	**61.91**	**17,000**	**139,600**	**399,000**	**34,500**	**28,400**
			EU-G105	NC46 (4 IF)	5 7/16	3 1/4	12,800	313,800	901,100	25,400	21,300
					138.11	**82.55**	**17,300**	**139,600**	**400,800**	**34,500**	**28,900**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in.	in	lb/ft			in	in	ft-lb	lb	lb	ft-lb	ft-lb
mm	**mm**	**kg/m**			**mm**	**mm**	**N.m**	**daN**	**daN**	**N.m**	**N.m**
4	3.340	14.00	IU-G105	4 H90	5 3/32	2 13/16	12,400	313,800	913,700	25,400	20,800
101.6	**84.84**	**20.83**			**129.38**	**71.44**	**16,900**	**139,600**	**406,400**	**34,500**	**28,200**
			G105	4 SH(3 1/2 XH)	4 17/32	2 7/16	10,100	313,800	570,900	25,400	16,800
					115.09	**61.91**	**13,700**	**139,600**	**253,900**	**34,500**	**22,800**
			IU-S135	NC40 (4 FH)	5 1/64	2 13/16	12,800	403,500	711,600	32,700	21,400
					127.40	**71.44**	**17,400**	**179,400**	**316,500**	**44,400**	**29,000**
			IU-S135	NC40 (4 FH)	5 1/4	2 13/16	14,000	403,500	711,600	32,700	23,400
					133.35	**71.44**	**19,100**	**179,400**	**316,500**	**44,400**	**31,800**
			IU-S135	4 H90	5 1/2	2 13/16	21,200	403,500	913,700	32,700	35,300
					139.70	**71.44**	**28,700**	**179,400**	**406,400**	**44,400**	**47,900**
			EU-S135	NC46 (4 IF)	5 9/16	3 1/4	15,700	403,500	901,100	32,700	26,300
					141.29	**82.55**	**21,400**	**179,400**	**400,800**	**44,400**	**35,600**
			S135	4 SH(3 1/2 XH)	4 17/32	2 9/16	9,000	403,500	512,000	32,700	15,000
					115.09	**65.09**	**12,200**	**179,400**	**227,700**	**44,400**	**20,400**
			S135	4 SH(3 1/2 XH)	4 17/32	2 7/16	10,100	403,500	570,900	32,700	16,800
					115.09	**61.91**	**13,700**	**179,400**	**253,900**	**44,400**	**22,800**
	3.240	15.70	IU-E75	NC40 (4 FH)	4 7/8	2 11/16	10,100	253,800	776,400	20,000	16,900
	82.30	**23.36**			**123.83**	**68.26**	**13,800**	**112,900**	**345,300**	**27,200**	**23,000**
			EU-E75	NC46 (4 IF)	5 5/16	3 1/4	9,900	253,800	901,100	20,000	16,500
					134.94	**82.55**	**13,400**	**112,900**	**400,800**	**27,200**	**22,400**
			IU-E75	4 H90	4 31/32	2 13/16	9,600	253,800	913,700	20,000	16,100
					126.21	**71.44**	**13,100**	**112,900**	**406,400**	**27,200**	**21,800**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
4 **101.6**	3.240 **82.30**	15.70 **23.36**	E75	4SH (3 1/2 XH)	4 17/32 **115.09**	2 7/16 **61.91**	10,100 **13,700**	253,800 **112,900**	570,900 **253,900**	20,000 **27,200**	16,800 **22,800**
			IU-X95	NC40 (4 FH)	5 **127.00**	2 7/16 **61.91**	12,500 **17,000**	321,500 **143,000**	897,100 **399,000**	25,400 **34,400**	20,900 **28,400**
			EU-X95	NC46 (4 IF)	5 7/16 **138.11**	3 **76.20**	12,800 **17,300**	321,500 **143,000**	1,048,400 **466,300**	25,400 **34,400**	21,300 **28,900**
			IU-X95	4 H90	5 3/32 **129.38**	2 13/16 **71.44**	12,400 **16,900**	321,500 **143,000**	913,700 **406,400**	25,400 **34,400**	20,800 **28,200**
			X95	4SH (3 1/2 XH)	4 17/32 **115.09**	2 7/16 **61.91**	10,100 **13,700**	321,500 **143,000**	570,900 **253,900**	25,400 **34,400**	16,800 **22,800**
			EU-G105	NC46 (4 IF)	5 15/32 **138.91**	3 **76.20**	13,500 **18,300**	355,300 **158,000**	1,048,400 **466,300**	28,000 **38,000**	22,500 **30,600**
			IU-G105	NC40 (4 FH)	5 1/2 **139.70**	2 7/16 **61.91**	18,000 **24,400**	355,300 **158,000**	897,100 **399,000**	28,000 **38,000**	30,100 **40,800**
			IU-G105	4 H90	5 5/32 **130.97**	2 13/16 **71.44**	13,900 **18,800**	355,300 **158,000**	913,700 **406,400**	28,000 **38,000**	23,200 **31,400**
			G105	4SH (3 1/2 XH)	4 17/32 **115.09**	2 7/16 **61.91**	10,100 **13,700**	355,300 **158,000**	570,900 **253,900**	28,000 **38,000**	16,800 **22,800**
			EU-S135	NC46 (4 IF)	5 21/32 **143.67**	2 5/8 **66.68**	18,000 **24,500**	456,900 **203,200**	1,247,200 **554,700**	36,100 **48,900**	30,100 **40,800**
			EU-S135	NC46 (4 IF)	5 21/32 **143.67**	2 7/8 **73.03**	18,000 **24,500**	456,900 **203,200**	1,117,600 **497,100**	36,100 **48,900**	30,100 **40,800**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
4 **101.6**	3.240 **82.30**	15.70 **23.36**	S135	4SH (3 1/2 XH)	4 17/32 **115.09**	2 7/16 **61.91**	10,100 **13,700**	456,900 **203,200**	570,900 **253,900**	36,100 **48,900**	16,800 **22,800**
4 1/2 **114.3**	3.958 **100.53**	13.75 **20.46**	IU-E75	4 1/2 H90	6 **152.40**	3 1/4 **82.55**	23,300 **31,600**	213,200 **94,800**	938,400 **417,400**	20,400 **27,600**	38,900 **52,700**
			EU-E75	NC50 (4 1/2 IF)	6 5/8 **168.28**	3 3/4 **95.25**	22,800 **30,900**	213,200 **94,800**	939,000 **417,700**	20,400 **27,600**	38,000 **51,600**
			EU-E75	4 1/2 OH	5 3/4 **146.05**	3 31/32 **100.81**	12,500 **17,000**	213,200 **94,800**	554,800 **246,800**	20,400 **27,600**	20,900 **28,300**
			EU-E75	4 1/2 WO	6 1/8 **155.58**	3 7/8 **98.43**	20,100 **27,300**	213,200 **94,800**	849,200 **377,700**	20,400 **27,600**	33,600 **45,600**
	3.826 **97.18**	16.60 **24.70**	IEU-E75	4 1/2 FH	5 3/8 **136.53**	3 **76.20**	12,100 **16,400**	260,100 **115,700**	976,100 **434,200**	24,100 **32,700**	20,200 **27,300**
			IEU-E75	NC46 (4 IF)	5 13/32 **137.32**	3 1/4 **82.55**	12,000 **16,300**	260,100 **115,700**	901,100 **400,800**	24,100 **32,700**	20,100 **27,300**
			IEU-E75	NC 46 (4 IF)	5 23/32 **145.26**	3 1/4 **82.55**	19,600 **26,600**	260,100 **115,700**	901,100 **400,800**	24,100 **32,700**	32,700 **44,300**
			IEU-E75	4 1/2 OH	5 7/16 **138.11**	3 3/4 **95.25**	11,800 **16,000**	260,100 **115,700**	713,900 **317,500**	24,100 **32,700**	19,700 **26,800**
			IEU-E75	NC38 (4 1/2 SH)	5 **127.00**	2 11/16 **68.26**	11,000 **14,900**	260,100 **115,700**	587,300 **261,200**	24,100 **32,700**	18,300 **24,800**
			IEU-E75	NC50 (4 1/2 IF)	5 23/32 **145.26**	3 3/4 **95.25**	11,500 **15,700**	260,100 **115,700**	939,000 **417,700**	24,100 **32,700**	19,300 **26,100**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
4 1/2 **114.3**	3.826 **97.18**	16.60 **24.70**	IEU-E75	4 1/2 H90	5 11/32 **135.73**	3 1/4 **82.55**	12,200 **16,500**	260,100 **115,700**	938,400 **417,400**	24,100 **32,700**	20,300 **27,600**
			IEU-X95	4 1/2 FH	5 1/2 **139.70**	2 3/4 **69.85**	14,900 **20,200**	329,500 **146,500**	1,111,600 **494,400**	30,500 **41,400**	24,900 **33,700**
			IEU-X95	NC46 (4 IF)	5 17/32 **140.49**	3 1/4 **82.55**	15,000 **20,300**	329,500 **146,500**	901,100 **400,800**	30,500 **41,400**	25,000 **33,900**
			IEU-X95	NC46 (4 IF)	5 7/8 **149.23**	3 **76.20**	23,400 **31,700**	329,500 **146,500**	1,048,400 **466,300**	30,500 **41,400**	39,000 **52,800**
			EU-X95	NC50 (4 1/2 IF)	5 27/32 **148.43**	3 3/4 **95.25**	14,900 **20,200**	329,500 **146,500**	939,000 **417,700**	30,500 **41,400**	24,800 **33,700**
			IEU-X95	4 1/2 H90	5 15/32 **138.91**	3 **76.20**	15,400 **20,900**	329,500 **146,500**	1,085,600 **482,900**	30,500 **41,400**	25,700 **34,800**
			IEU-G105	4 1/2 FH	5 9/16 **141.29**	2 3/4 **69.85**	16,300 **22,200**	364,200 **162,000**	1,111,600 **494,400**	33,700 **45,800**	27,300 **37,000**
			IEU-G105	NC46 (4 IF)	5 19/32 **142.08**	3 **76.20**	16,500 **22,400**	364,200 **162,000**	1,048,400 **466,300**	33,700 **45,800**	27,500 **37,300**
			IEU-G105	NC46 (4 IF)	5 7/8 **149.23**	3 **76.20**	23,400 **31,700**	364,200 **162,000**	1,048,400 **466,300**	33,700 **45,800**	39,000 **52,800**
			EU-G105	NC50 (4 1/2 IF)	5 29/32 **150.02**	3 3/4 **95.25**	16,600 **22,500**	364,200 **162,000**	939,000 **417,700**	33,700 **45,800**	27,700 **37,500**
			IEU-G105	4 1/2 H90	5 1/2 **139.70**	3 **76.20**	16,200 **22,000**	364,200 **162,000**	1,085,600 **482,900**	33,700 **45,800**	27,100 **36,700**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
4 1/2 **114.3**	3.826 **97.18**	16.60 **24.70**	IEU-S135	NC46 (4 IF)	5 25/32 **146.84**	2 3/4 **69.85**	21,200 **28,700**	468,200 **208,300**	1,183,900 **526,600**	43,400 **58,900**	35,300 **47,900**
			IEU-S135	NC46 (4 IF)	5 7/8 **149.23**	3 **76.20**	23,400 **31,700**	468,200 **208,300**	1,048,400 **466,300**	43,400 **58,900**	39,000 **52,800**
			IEU-S135	4 1/2 FH	6 1/4 **158.75**	2 1/2 **63.50**	26,800 **36,400**	468,200 **208,300**	1,235,300 **549,500**	43,400 **58,900**	44,700 **60,600**
			IEU-S135	4 1/2 H90	6 **152.40**	3 **76.20**	27,000 **36,700**	468,200 **208,300**	1,085,600 **482,900**	43,400 **58,900**	45,100 **61,200**
			IEU-S135	NC50 (4 1/2 IF)	6 1/16 **153.99**	3 1/2 **88.90**	21,000 **28,400**	468,200 **208,300**	1,109,900 **493,700**	43,400 **58,900**	35,000 **47,400**
	3.640 **92.46**	20.00 **29.76**	IEU-E75	4 1/2 FH	5 15/32 **138.91**	3 **76.20**	14,200 **19,200**	322,900 **143,600**	976,100 **434,200**	28,600 **38,800**	23,700 **32,100**
			IEU-E75	NC46(4 IF)	5 1/2 **139.70**	3 **76.20**	14,200 **19,300**	322,900 **143,600**	1,048,400 **466,300**	28,600 **38,800**	23,800 **32,200**
			IEU-E75	NC46 (4 IF)	5 7/8 **149.23**	2 3/4 **69.85**	23,600 **32,000**	322,900 **143,600**	1,183,900 **526,600**	28,600 **38,800**	39,400 **53,400**
			IEU-E75	NC50 (4 1/2 IF)	5 13/16 **147.64**	3 5/8 **92.08**	14,000 **19,000**	322,900 **143,600**	1,025,900 **456,300**	28,600 **38,800**	23,400 **31,800**
			IEU-E75	4 1/2 H90	5 13/32 **137.32**	3 **76.20**	13,800 **18,700**	322,900 **143,600**	1,085,600 **482,900**	28,600 **38,800**	23,000 **31,200**
			IEU-X95	4 1/2 FH	5 5/8 **142.88**	2 1/2 **63.50**	17,800 **24,200**	409,000 **181,900**	1,235,300 **549,500**	36,300 **49,200**	29,700 **40,300**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
4 1/2 **114.3**	3.640 **92.46**	20.00 **29.76**	IEU-X95	NC46 (4 IF)	5 21/32 **143.67**	2 3/4 **69.85**	18,000 **24,500**	409,000 **181,900**	1,183,900 **526,600**	36,300 **49,200**	30,100 **40,800**
			IEU-X95	NC46 (4 IF)	5 7/8 **149.23**	2 3/4 **69.85**	23,600 **32,000**	409,000 **181,900**	1,183,900 **526,600**	36,300 **49,200**	39,400 **53,400**
			EU-X95	NC50 (4 1/2 IF)	5 15/16 **150.81**	3 1/2 **88.90**	17,400 **23,700**	409,000 **181,900**	1,109,900 **493,700**	36,300 **49,200**	29,100 **39,500**
			IEU-X95	4 1/2 H90	5 9/16 **141.29**	3 **76.20**	17,900 **24,300**	409,000 **181,900**	1,085,600 **482,900**	36,300 **49,200**	29,800 **40,500**
			IEU-G105	NC46 (4 IF)	5 23/32 **145.26**	2 1/2 **63.50**	19,600 **26,600**	452,000 **201,000**	1,307,600 **581,600**	40,100 **54,400**	32,700 **44,300**
			IEU-G105	4 1/2 FH	6 **152.40**	2 1/2 **63.50**	26,500 **36,000**	452,000 **201,000**	1,235,300 **549,500**	40,100 **54,400**	44,200 **60,000**
			IEU-G105	4 1/2 H90	6 **152.40**	3 **76.20**	27,000 **36,700**	452,000 **201,000**	1,085,600 **482,900**	40,100 **54,400**	45,100 **61,200**
			EU-G105	NC50 (4 1/2 IF)	6 1/32 **153.19**	3 1/2 **88.90**	20,100 **27,200**	452,000 **201,000**	1,109,900 **493,700**	40,100 **54,400**	33,500 **45,400**
			EU-S135	NC50 (4 1/2 IF)	6 7/32 **157.96**	2 7/8 **73.03**	25,500 **34,600**	581,200 **258,500**	1,485,400 **660,700**	51,600 **70,000**	42,600 **57,700**
			IEU-S135	NC46 (4 IF)	6 1/4 **158.75**	2 1/4 **57.15**	32,300 **43,800**	581,200 **258,500**	1,419,500 **631,400**	51,600 **70,000**	53,900 **73,100**
			IEU-S135	NC46 (4 IF)	5 7/8 **149.23**	2 3/4 **69.85**	23,600 **32,000**	581,200 **258,500**	1,183,900 **526,600**	51,600 **70,000**	39,400 **53,400**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
4 1/2 **114.3**	3.500 **88.90**	22.82 **33.96**	EU-E75	NC50 (4 1/2 IF)	6 5/8 **168.28**	3 5/8 **92.08**	24,900 **33,800**	367,500 **163,500**	1,025,900 **456,300**	31,500 **42,800**	41,600 **56,400**
			IEU-E75	NC46 (4 IF)	6 1/4 **158.75**	3 **76.20**	23,700 **32,200**	367,500 **163,500**	1,048,400 **466,300**	31,500 **42,800**	39,600 **53,700**
			IEU-X95	4 1/2 FH	6 1/4 **158.75**	2 1/4 **57.15**	29,300 **39,700**	465,500 **207,100**	1,347,200 **599,200**	40,000 **54,200**	48,900 **66,300**
			EU-X95	NC50 (4 1/2 IF)	6 5/8 **168.28**	3 1/2 **88.90**	27,000 **36,700**	465,500 **207,100**	1,109,900 **493,700**	40,000 **54,200**	45,100 **61,100**
			IEU-X95	NC46 (4 IF)	5 7/8 **149.23**	2 3/4 **69.85**	23,600 **32,000**	465,500 **207,100**	1,183,900 **526,600**	40,000 **54,200**	39,400 **53,400**
			IEU-X95	NC46 (4 IF)	6 1/4 **158.75**	2 3/4 **69.85**	26,900 **36,500**	465,500 **207,100**	1,183,900 **526,600**	40,000 **54,200**	44,800 **60,800**
			EU-G105	NC50 (4 1/2 IF)	6 5/8 **168.28**	3 1/4 **82.55**	31,000 **42,000**	514,500 **228,900**	1,268,900 **564,400**	44,200 **59,900**	51,700 **70,100**
			IEU-G105	NC46(4 IF)	6 1/4 **158.75**	2 1/2 **63.50**	29,700 **40,300**	514,500 **228,900**	1,307,600 **581,600**	44,200 **59,900**	49,600 **67,200**
			EU-S135	NC50 (4 1/2 IF)	6 5/8 **168.28**	2 3/4 **69.85**	38,000 **51,500**	661,600 **294,300**	1,551,700 **690,200**	56,800 **77,000**	63,400 **85,900**
5 **127.0**	4.276 **108.61**	19.50 **29.02**	IEU-E75	5 1/2 FH	7 **177.80**	3 3/4 **95.25**	37,700 **51,100**	311,500 **138,500**	1,448,400 **644,200**	32,200 **43,700**	62,900 **85,200**
			IEU-E75	NC50 (4 1/2 IF)	5 7/8 **149.23**	3 3/4 **95.25**	15,700 **21,300**	311,500 **138,500**	939,000 **417,700**	32,200 **43,700**	26,200 **35,600**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
5 **127.0**	4.276 **108.61**	19.50 **29.02**	IEU-E75	NC50 (4 1/2 IF)	5 31/32 **151.61**	3 3/4 **95.25**	18,300 **24,900**	311,500 **138,500**	939,000 **417,700**	32,200 **43,700**	30,600 **41,500**
			E75	5 XH	6 3/16 **157.16**	3 3/4 **95.25**	22,400 **30,400**	311,500 **138,500**	939,000 **417,700**	32,200 **43,700**	37,300 **50,600**
			IEU-X95	NC50 (4 1/2 IF)	6 1/32 **153.19**	3 1/2 **88.90**	20,100 **27,200**	394,600 **175,500**	1,109,900 **493,700**	40,800 **55,400**	33,500 **45,400**
			IEU-X95	5 1/2 FH	7 **177.80**	3 3/4 **95.25**	37,700 **51,100**	394,600 **175,500**	1,448,400 **644,200**	40,800 **55,400**	62,900 **85,200**
			IEU-X95	5 H90	5 27/32 **148.43**	3 1/4 **82.55**	19,800 **26,900**	394,600 **175,500**	1,176,200 **523,200**	40,800 **55,400**	33,100 **44,800**
			IEU-X95	5 XH	6 3/16 **157.16**	3 **76.20**	24,600 **33,400**	394,600 **175,500**	1,416,200 **629,900**	40,800 **55,400**	41,000 **55,600**
			IEU-G105	NC50 (4 1/2 IF)	6 3/32 **154.78**	3 1/4 **82.55**	21,900 **29,700**	436,100 **194,000**	1,268,900 **564,400**	45,100 **61,200**	36,500 **49,500**
			IEU-G105	5 1/2 FH	7 **177.80**	3 3/4 **95.25**	37,700 **51,100**	436,100 **194,000**	1,448,400 **644,200**	45,100 **61,200**	62,900 **85,200**
			IEU-G105	5 H90	5 29/32 **150.02**	3 **76.20**	21,700 **29,400**	436,100 **194,000**	1,323,500 **588,700**	45,100 **61,200**	36,200 **49,000**
			IEU-G105	5 XH	6 3/16 **157.16**	3 **76.20**	24,600 **33,400**	436,100 **194,000**	1,416,200 **629,900**	45,100 **61,200**	41,000 **55,600**
			IEU-S135	NC50 (4 1/2 IF)	6 7/64 **155.18**	3 1/2 **88.90**	22,300 **30,300**	560,700 **249,400**	1,109,900 **493,700**	58,100 **78,700**	37,200 **50,500**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
5 **127.0**	4.276 **108.61**	19.50 **29.02**	IEU-S135	NC50 (4 1/2 IF)	6 7/32 **157.96**	3 **76.20**	25,500 **34,600**	560,700 **249,400**	1,416,200 **629,900**	58,100 **78,700**	42,600 **57,700**
			IEU-S135	NC50 (4 1/2 IF)	6 5/16 **160.34**	2 3/4 **69.85**	28,300 **38,400**	560,700 **249,400**	1,551,700 **690,200**	58,100 **78,700**	47,300 **64,100**
			IEU-S135	5 1/2 FH	6 3/4 **171.45**	3 1/2 **88.90**	28,700 **38,900**	560,700 **249,400**	1,619,200 **720,200**	58,100 **78,700**	47,800 **64,900**
			IEU-S135	5 XH	6 3/16 **157.16**	3 **76.20**	24,600 **33,400**	560,700 **249,400**	1,416,200 **629,900**	58,100 **78,700**	41,000 **55,600**
	4.000 **101.60**	25.60 **38.10**	IEU-E75	NC50 (4 1/2 IF)	6 1/32 **153.19**	3 1/2 **88.90**	20,100 **27,200**	414,600 **184,400**	1,109,900 **493,700**	40,500 **54,900**	33,500 **45,400**
			IEU-E75	5 1/2 FH	6 1/2 **165.10**	3 1/2 **88.90**	20,200 **27,300**	414,600 **184,400**	1,619,200 **720,200**	40,500 **54,900**	33,600 **45,600**
			IEU-E75	5 XH	6 3/16 **157.16**	3 **76.20**	24,600 **33,400**	414,600 **184,400**	1,416,200 **629,900**	40,500 **54,900**	41,000 **55,600**
			IEU-X95	NC50 (4 1/2 IF)	6 7/32 **157.96**	3 **76.20**	25,500 **34,600**	525,200 **233,600**	1,416,200 **629,900**	51,300 **69,600**	42,600 **57,700**
			IEU-X95	5 1/2 FH	6 21/32 **169.07**	3 1/2 **88.90**	25,400 **34,500**	525,200 **233,600**	1,619,200 **720,200**	51,300 **69,600**	42,400 **57,500**
			IEU-X95	5 XH	6 3/16 **157.16**	3 **76.20**	24,600 **33,400**	525,200 **233,600**	1,416,200 **629,900**	51,300 **69,600**	41,000 **55,600**
			IEU-G105	NC50 (4 1/2 IF)	6 9/32 **159.54**	2 3/4 **69.85**	27,400 **37,100**	580,500 **258,200**	1,551,700 **690,200**	56,700 **76,900**	45,700 **61,900**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
5 **127.0**	4.000 **101.60**	25.60 **38.10**	IEU-G105	5 1/2 FH	6 23/32 **170.66**	3 1/2 **88.90**	27,600 **37,400**	580,500 **258,200**	1,619,200 **720,200**	56,700 **76,900**	46,000 **62,400**
			IEU-G105	5 XH	6 3/16 **157.16**	3 **76.20**	24,600 **33,400**	580,500 **258,200**	1,416,200 **629,900**	56,700 **76,900**	41,000 **55,600**
			IEU-S135	NC50 (4 1/2 IF)	6 7/32 **157.96**	3 **76.20**	25,500 **34,600**	746,400 **332,000**	1,416,200 **629,900**	72,900 **98,900**	42,600 **57,700**
			IEU-S135	5 1/2 FH	6 15/16 **176.21**	3 1/4 **82.55**	35,400 **48,000**	746,400 **332,000**	1,778,200 **791,000**	72,900 **98,900**	59,000 **80,000**
			IEU-S135	5 XH	6 3/16 **157.16**	3 **76.20**	24,600 **33,400**	746,400 **332,000**	1,416,200 **629,900**	72,900 **98,900**	41,000 **55,600**
5 1/2 **139.7**	4.778 **121.36**	21.90 **32.59**	IEU-E75	5 1/2 FH	6 15/32 **164.31**	4 **101.60**	19,100 **25,900**	344,700 **153,300**	1,265,800 **563,000**	39,800 **54,000**	31,900 **43,300**
			IEU-X95	5 1/2 FH	6 5/8 **168.28**	3 3/4 **95.25**	24,400 **33,000**	436,700 **194,200**	1,448,400 **644,200**	50,400 **68,400**	40,600 **55,100**
			IEU-X95	5 1/2 FH	7 1/16 **179.39**	3 1/2 **88.90**	40,000 **54,300**	431,100 **191,700**	1,619,200 **720,200**	49,900 **67,700**	66,700 **90,500**
			IEU-X95	5 1/2 H90	6 3/16 **157.16**	3 1/2 **88.90**	24,400 **33,100**	436,700 **194,200**	1,268,800 **564,400**	50,400 **68,400**	40,600 **55,100**
			IEU-G105	5 1/2 FH	6 23/32 **170.66**	3 1/2 **88.90**	27,600 **37,400**	482,600 **214,700**	1,619,200 **720,200**	55,800 **75,600**	46,000 **62,400**
			IEU-S135	5 1/2 FH	6 13/16 **173.04**	3 1/2 **88.90**	30,900 **41,900**	612,700 **272,500**	1,619,200 **720,200**	70,900 **96,200**	51,500 **69,900**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in.	in	lb/ft			in	in	ft-lb	lb	lb	ft-lb	ft-lb
mm	**mm**	**kg/m**			**mm**	**mm**	**N.m**	**daN**	**daN**	**N.m**	**N.m**
5 1/2	4.778	21.90	IEU-S135	5 1/2 FH	6 15/16	3	35,400	620,600	1,925,500	71,700	59,000
139.7	**121.36**	**32.59**			**176.21**	**76.20**	**48,000**	**276,000**	**856,500**	**97,200**	**80,000**
			IEU-S135	5 1/2 FH	7 1/16	3 1/2	40,000	612,700	1,619,200	709,700	66,700
					179.39	**88.90**	**54,300**	**272,500**	**720,200**	**962,300**	**90,500**
	4.670	24.70	IEU-E75	5 1/2 FH	6 9/16	4	22,200	391,200	1,265,800	44,300	37,100
	118.62	**36.76**			**166.69**	**101.60**	**30,200**	**174,000**	**563,000**	**60,000**	**50,300**
			IEU-X95	5 1/2 FH	6 23/32	3 1/2	27,600	495,600	1,619,200	56,100	46,000
					170.66	**88.90**	**37,400**	**220,400**	**720,200**	**76,100**	**62,400**
			IEU-X95	5 1/2 FH	6 23/32	3 1/2	27,600	495,600	1,619,200	56,100	46,000
					170.66	**88.90**	**37,400**	**220,400**	**720,200**	**76,100**	**62,400**
			IEU-X95	5 1/2 FH	7 1/16	3 1/2	40,000	495,600	1,619,200	56,100	66,700
					179.39	**88.90**	**54,300**	**220,400**	**720,200**	**76,100**	**90,500**
			IEU-G105	5 1/2 FH	6 25/32	3 1/2	29,800	547,700	1,619,200	62,000	49,700
					172.24	**88.90**	**40,400**	**243,600**	**720,200**	**84,100**	**67,400**
			IEU-S135	5 1/2 FH	7 1/32	3	38,900	704,300	1,925,500	79,700	64,800
					178.59	**76.20**	**52,700**	**313,200**	**856,500**	**108,100**	**87,900**
			IEU-S135	5 1/2 FH	7 1/16	3 1/2	40,000	704,300	1,619,200	79,700	66,700
					179.39	**88.90**	**54,300**	**313,200**	**720,200**	**108,100**	**90,500**
6 5/8	5.965	25.20	IEU-E75	6 5/8 FH	7 7/16	5	26,800	387,400	1,448,400	55,700	44,600
169.3	**151.51**	**37.50**			**188.91**	**127.00**	**36,300**	**172,300**	**644,200**	**75,600**	**60,500**
			IEU-X95	6 5/8 FH	7 5/8	5	35,100	490,700	1,448,400	70,600	58,500
					193.68	**127.00**	**47,600**	**218,300**	**644,200**	**95,700**	**79,400**

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PREMIUM DRILL PIPE & TOOL JOINT MECHANICAL PROPERTIES

Drill Pipe Data				Premium Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in.	in	lb/ft			in	in	ft-lb	lb	lb	ft-lb	ft-lb
mm	**mm**	**kg/m**			**mm**	**mm**	**N.m**	**daN**	**daN**	**N.m**	**N.m**
6 5/8	5.965	25.20	IEU-G105	6 5/8 FH	7 11/16	4 3/4	37,900	542,400	1,678,100	78,000	63,300
169.3	**151.51**	**37.50**			**195.26**	**120.65**	**51,400**	**241,200**	**746,400**	**105,800**	**85,800**
			IEU-S135	6 5/8 FH	7 13/16	5	43,700	697,400	1,448,400	100,300	72,900
					198.44	**127.00**	**59,300**	**310,200**	**644,200**	**136,000**	**98,900**
			IEU-S135	6 5/8 FH	7 29/32	4 1/4	48,200	697,400	2,102,200	100,300	80,300
					200.82	**107.95**	**65,300**	**310,200**	**935,100**	**136,000**	**108,900**
	5.901	27.70	IEU-E75	6 5/8 FH	7 1/2	5	29,500	422,400	1,448,400	60,100	49,200
	149.89	**41.22**			**190.50**	**127.00**	**40,000**	**187,900**	**644,200**	**81,600**	**66,700**
			IEU-X95	6 5/8 FH	7 11/16	4 3/4	37,900	535,000	1,678,100	76,200	63,300
					195.26	**120.65**	**51,400**	**238,000**	**746,400**	**103,300**	**85,800**
			IEU-G105	6 5/8 FH	7 3/4	4 3/4	40,800	591,300	1,678,100	84,200	68,100
					196.85	**120.65**	**55,300**	**263,000**	**746,400**	**114,200**	**92,300**
			IEU-G105	6 5/8 FH	7 13/16	4 3/4	43,700	591,300	1,678,100	84,200	72,900
					198.44	**120.65**	**59,300**	**263,000**	**746,400**	**114,200**	**98,900**
			IEU-S135	6 5/8 FH	7 13/16	4 1/4	43,700	760,300	2,102,200	108,300	72,900
					198.44	**107.95**	**59,300**	**338,200**	**935,100**	**146,800**	**98,900**
			IEU-S135	6 5/8 FH	8	4 1/4	52,700	760,300	2,102,200	108,300	87,800
					203.20	**107.95**	**71,400**	**338,200**	**935,100**	**146,800**	**119,100**

FOR REFRENCE SEE TABLE 1, 8, 9 & 10 (API RP7G; 16th EDITION; AUGUST 1998)

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Class 2 Drill Pipe & Tool Joint Mechanical Properties

Drill Pipe Data				Class 2 Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
2 3/8 **60.33**	1.995 **50.67**	4.85 **7.22**	EU-E75	NC26(2 3/8 IF)	3 3/32 **78.58**	1 3/4 **44.45**	1,600 **2,200**	66,600 **29,600**	313,600 **139,500**	3,200 **4,300**	2,800 **3,800**
			EU-E75	2 3/8 WO	3 1/32 **76.99**	2 **50.80**	1,700 **2,300**	66,600 **29,600**	195,600 **87,000**	3,200 **4,300**	2,900 **3,900**
			EU-E75	2 3/8 OHLW	2 31/32 **75.41**	2 **50.80**	1,500 **2,100**	66,600 **29,600**	206,200 **91,700**	3,200 **4,300**	2,600 **3,500**
			EU-E75	2 3/8 SL-H90	2 15/16 **74.61**	2 **50.80**	1,700 **2,300**	66,600 **29,600**	202,800 **90,200**	3,200 **4,300**	2,800 **3,800**
	1.815 **46.10**	6.65 **9.90**	IU-E75	2 3/8 PAC	2 23/32 **69.06**	1 3/8 **34.93**	2,000 **2,700**	92,800 **41,300**	238,500 **106,000**	4,100 **5,500**	3,400 **4,600**
			EU-E75	NC26(2 3/8 IF)	3 5/32 **80.17**	1 3/4 **44.45**	2,200 **2,900**	92,800 **41,300**	313,600 **139,500**	4,100 **5,500**	3,600 **4,900**
			EU-E75	2 3/8 SL-H90	2 31/32 **75.41**	2 **50.80**	1,900 **2,700**	92,800 **41,300**	202,800 **90,200**	4,100 **5,500**	3,300 **4,500**
			EU-E75	2 3/8 OHSW	3 1/32 **76.99**	1 3/4 **44.45**	2,000 **2,800**	92,800 **41,300**	294,600 **131,000**	4,100 **5,500**	3,400 **4,600**
			EU-X95	NC26(2 3/8 IF)	3 7/32 **81.76**	1 3/4 **44.45**	2,700 **3,700**	117,600 **52,300**	313,600 **139,500**	5,200 **7,000**	4,500 **6,100**
			EU-G105	NC26(2 3/8 IF)	3 1/4 **82.55**	1 3/4 **44.45**	3,000 **4,000**	130,000 **57,800**	313,600 **139,500**	5,700 **7,800**	5,000 **6,700**
2 7/8 **73.0**	2.441 **62.00**	6.85 **10.19**	EU-E75	NC31(2 7/8 IF)	3 21/32 **92.87**	2 1/8 **53.98**	2,800 **3,800**	92,800 **41,200**	447,100 **198,800**	5,400 **7,400**	4,600 **6,300**

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Class 2 Drill Pipe & Tool Joint Mechanical Properties

Drill Pipe Data				Class 2 Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
2 7/8 **73.0**	2.441 **62.00**	6.85 **10.19**	EU-E75	2 7/8 WO	3 19/32 **91.28**	2 7/16 **61.91**	2,800 **3,800**	92,800 **41,200**	277,500 **123,400**	5,400 **7,400**	4,700 **6,400**
			EU-E75	2 7/8 OHLW	3 7/16 **87.31**	2 7/16 **61.91**	2,600 **3,600**	92,800 **41,200**	223,700 **99,500**	5,400 **7,400**	4,400 **6,000**
			EU-E75	2 7/8 SL-H90	3 7/16 **87.31**	2 7/16 **61.91**	2,600 **3,600**	92,800 **41,200**	260,900 **116,000**	5,400 **7,400**	4,400 **6,000**
	2.151 **54.64**	10.40 **15.48**	EU-E75	NC31(2 7/8 IF)	3 3/4 **95.25**	2 1/8 **53.98**	3,800 **5,200**	143,500 **63,800**	447,100 **198,800**	7,500 **10,200**	6,400 **8,700**
			IU-E75	2 7/8 XH	3 21/32 **92.87**	1 7/8 **47.63**	3,600 **4,900**	143,500 **63,800**	505,000 **224,600**	7,500 **10,200**	6,100 **8,200**
			IU-E75	NC26(2 3/8 IF)	3 11/32 **84.93**	1 3/4 **44.45**	3,800 **5,200**	143,500 **63,800**	313,600 **139,500**	7,500 **10,200**	6,300 **8,600**
			EU-E75	2 7/8 OHSW	3 9/16 **90.49**	2 5/32 **54.77**	3,900 **5,300**	143,500 **63,800**	345,500 **153,600**	7,500 **10,200**	6,500 **8,900**
			EU-E75	2 7/8 SL-H90	3 17/32 **89.69**	2 5/32 **54.77**	3,700 **5,100**	143,500 **63,800**	382,700 **170,200**	7,500 **10,200**	6,200 **8,500**
			IU-E75	2 7/8 PAC	3 1/8 **79.38**	1 1/2 **38.10**	3,400 **4,600**	143,500 **63,800**	273,000 **121,400**	7,500 **10,200**	5,700 **7,700**
			EU-X95	NC31(2 7/8 IF)	3 27/32 **97.63**	2 **50.80**	4,900 **6,700**	181,800 **80,800**	495,700 **220,500**	9,600 **13,000**	8,200 **11,200**
			EU-X95	2 7/8 SL-H90	3 5/8 **92.08**	2 5/32 **54.77**	4,900 **6,600**	181,800 **80,800**	382,700 **170,200**	9,600 **13,000**	8,100 **11,100**

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Class 2 Drill Pipe & Tool Joint Mechanical Properties

Drill Pipe Data				Class 2 Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
2 7/8 **73.0**	2.151 **54.64**	10.40 **15.48**	EU-G105	NC31(2 7/8 IF)	3 7/8 **98.43**	2 **50.80**	5,300 **7,200**	200,900 **89,400**	495,700 **220,500**	10,600 **14,400**	8,900 **12,000**
			EU-S135	NC31(2 7/8 IF)	4 **101.60**	1 5/8 **41.28**	6,800 **9,300**	258,400 **114,900**	623,800 **277,400**	13,600 **18,500**	11,400 **15,500**
3 1/2 **88.9**	2.992 **76.00**	9.50 **14.14**	EU-E75	NC38 (3 1/2 IF)	4 11/32 **110.33**	3 **76.20**	4,700 **6,500**	132,700 **59,000**	419,700 **186,700**	9,600 **13,000**	7,900 **10,800**
			EU-E75	NC38 (3 1/2 IF)	4 11/32 **110.33**	2 11/16 **68.26**	4,700 **6,500**	132,700 **59,000**	587,300 **261,200**	9,600 **13,000**	7,900 **10,800**
			EU-E75	3 1/2 OHLW	4 1/4 **107.95**	3 **76.20**	4,800 **6,600**	132,700 **59,000**	392,000 **174,400**	9,600 **13,000**	8,100 **11,000**
			EU-E75	3 1/2 SL-H90	4 5/32 **105.57**	3 **76.20**	5,000 **6,700**	132,700 **59,000**	366,700 **163,100**	9,600 **13,000**	8,300 **11,300**
	2.764 **70.21**	13.30 **19.79**	EU-E75	NC38 (3 1/2 IF)	4 7/16 **112.71**	2 11/16 **68.26**	6,200 **8,400**	183,300 **81,500**	587,300 **261,200**	12,300 **16,700**	10,400 **14,100**
			IU-E75	NC31 (2 7/8 IF)	3 15/16 **100.01**	2 1/8 **53.98**	6,100 **8,200**	183,300 **81,500**	447,100 **198,800**	12,300 **16,700**	10,100 **13,800**
			EU-E75	3 1/2 OHSW	4 11/32 **110.33**	2 11/16 **68.26**	6,200 **8,500**	183,300 **81,500**	559,500 **248,900**	12,300 **16,700**	10,400 **14,200**
			EU-E75	3 1/2 H90	4 1/2 **114.30**	2 3/4 **69.85**	6,400 **8,700**	183,300 **81,500**	664,000 **295,300**	12,300 **16,700**	10,800 **14,600**
			EU-X95	NC38 (3 1/2 IF)	4 17/32 **115.09**	2 9/16 **65.09**	7,700 **10,500**	232,300 **103,300**	649,100 **288,700**	15,600 **21,200**	12,900 **17,500**

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Class 2 Drill Pipe & Tool Joint Mechanical Properties

Drill Pipe Data				Class 2 Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
3 1/2 **88.9**	2.764 **70.21**	13.30 **19.79**	EU-X95	3 1/2 SL-H90	4 5/16 **109.54**	2 11/16 **68.26**	7,600 **10,300**	232,300 **103,300**	534,200 **237,600**	15,600 **21,200**	12,700 **17,200**
			EU-X95	3 1/2 H90	4 9/16 **115.89**	2 3/4 **69.85**	7,600 **10,300**	232,300 **103,300**	664,000 **295,300**	15,600 **21,200**	12,700 **17,200**
			EU-G105	NC38 (3 1/2 IF)	4 19/32 **116.68**	2 7/16 **61.91**	8,800 **11,900**	256,700 **114,200**	708,000 **314,900**	17,300 **23,400**	14,700 **19,900**
			EU-S135	NC40 (4FH)	4 29/32 **124.62**	2 7/16 **61.91**	10,700 **14,500**	330,100 **146,800**	897,100 **399,000**	22,200 **30,100**	17,900 **24,300**
			EU-S135	NC38 (3 1/2 IF)	4 23/32 **119.86**	2 1/8 **53.98**	10,900 **14,800**	330,100 **146,800**	842,400 **374,700**	22,200 **30,100**	18,200 **24,700**
	2.602 **66.09**	15.50 **23.07**	EU-E75	NC38 (3 1/2 IF)	4 15/32 **113.51**	2 9/16 **65.09**	6,700 **9,100**	215,900 **96,000**	649,100 **288,700**	13,800 **18,700**	11,200 **15,200**
			EU-X95	NC38(3 1/2 IF)	4 19/32 **116.68**	2 7/16 **61.91**	8,800 **11,900**	273,500 **121,600**	708,000 **314,900**	17,500 **23,700**	14,700 **19,900**
			EU-G105	NC38 (3 1/2 IF)	4 5/8 **117.48**	2 1/8 **53.98**	9,300 **12,600**	302,300 **134,400**	842,400 **374,700**	19,300 **26,200**	15,500 **21,100**
			EU-G105	NC40 (4 FH)	4 27/32 **123.03**	2 9/16 **65.09**	9,500 **13,000**	302,300 **134,400**	838,200 **372,800**	19,300 **26,200**	15,900 **21,600**
			EU-S135	NC40(4FH)	4 31/32 **126.21**	2 1/4 **57.15**	11,900 **16,200**	388,700 **172,900**	979,900 **435,900**	24,800 **33,700**	19,900 **27,000**
4 **101.6**	3.476 **88.29**	11.85 **17.63**	EU-E75	NC46 (4 IF)	5 5/32 **130.97**	3 1/4 **82.55**	6,400 **8,700**	158,100 **70,300**	901,100 **400,800**	13,200 **18,000**	10,700 **14,600**

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Class 2 Drill Pipe & Tool Joint Mechanical Properties

Drill Pipe Data				Class 2 Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
4 **101.6**	3.476 **88.29**	11.85 **17.63**	EU-E75	4 WO	5 5/32 **130.97**	3 7/16 **87.31**	6,400 **8,700**	158,100 **70,300**	782,900 **348,200**	13,200 **18,000**	10,700 **14,600**
			EU-E75	4 OH LW	4 15/16 **125.41**	3 15/32 **88.11**	6,500 **8,900**	158,100 **70,300**	621,300 **276,300**	13,200 **18,000**	10,900 **14,800**
			IU-E75	4 H90	4 27/32 **123.03**	2 13/16 **71.44**	6,900 **9,400**	158,100 **70,300**	913,700 **406,400**	13,200 **18,000**	11,600 **15,700**
	3.340 **84.84**	14.00 **20.83**	IU-E75	NC40 (4 FH)	4 3/4 **120.65**	2 13/16 **71.44**	7,800 **10,600**	194,300 **86,400**	711,600 **316,500**	15,700 **21,300**	13,100 **17,700**
			EU-E75	NC46 (4 IF)	5 7/32 **132.56**	3 1/4 **82.55**	7,800 **10,600**	194,300 **86,400**	901,100 **400,800**	15,700 **21,300**	13,000 **17,700**
			IU-E75	4 SH	4 3/8 **111.13**	2 9/16 **65.09**	7,800 **10,500**	194,300 **86,400**	512,000 **227,700**	15,700 **21,300**	13,000 **17,600**
			EU-E75	4 OHSW	5 **127.00**	3 1/4 **82.55**	7,800 **10,600**	194,300 **86,400**	759,800 **338,000**	15,700 **21,300**	13,000 **17,700**
			IU-E75	4 H90	4 7/8 **123.83**	2 13/16 **71.44**	7,600 **10,300**	194,300 **86,400**	913,700 **406,400**	15,700 **21,300**	12,700 **17,200**
			IU-X95	NC40 (4 FH)	4 27/32 **123.03**	2 11/16 **68.26**	9,500 **13,000**	246,100 **109,500**	776,400 **345,300**	19,900 **27,000**	15,900 **21,600**
			EU-X95	NC46 (4 IF)	5 5/16 **134.94**	3 1/4 **82.55**	9,900 **13,400**	246,100 **109,500**	901,100 **400,800**	19,900 **27,000**	16,500 **22,400**
			IU-X95	4 H90	4 31/32 **126.21**	2 13/16 **71.44**	9,600 **13,100**	246,100 **109,500**	913,700 **406,400**	19,900 **27,000**	16,100 **21,800**

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Class 2 Drill Pipe & Tool Joint Mechanical Properties

Drill Pipe Data				Class 2 Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
4	3.340	14.00	IU-G105	NC40 (4 FH)	4 29/32	2 7/16	10,700	272,100	897,100	22,000	17,900
101.6	**84.84**	**20.83**			**124.62**	**61.91**	**14,500**	**121,000**	**399,000**	**29,800**	**24,300**
			EU-G105	NC46 (4 IF)	5 11/32	3 1/4	10,600	272,100	901,100	22,000	17,700
					135.73	**82.55**	**14,400**	**121,000**	**400,800**	**29,800**	**24,000**
			IU-G105	4 H90	5 1/32	2 13/16	11,000	272,100	913,700	22,000	18,400
					127.79	**71.44**	**15,000**	**121,000**	**406,400**	**29,800**	**25,000**
			EU-S135	NC46 (4 IF)	5 1/2	3	14,200	349,800	1,048,400	28,300	23,800
					139.70	**76.20**	**19,300**	**155,600**	**466,300**	**38,400**	**32,200**
	3.240	15.70	IU-E75	NC40 (4 FH)	4 25/32	2 11/16	8,400	219,700	776,400	17,300	14,000
	82.30	**23.36**			**121.44**	**68.26**	**11,400**	**97,700**	**345,300**	**23,400**	**19,000**
			EU-E75	NC46 (4 IF)	5 1/4	3 1/4	8,500	219,700	901,100	17,300	14,200
					133.35	**82.55**	**11,500**	**97,700**	**400,800**	**23,400**	**19,200**
			IU-E75	4 H90	4 29/32	2 13/16	8,300	219,700	913,700	17,300	13,800
					124.62	**71.44**	**11,200**	**97,700**	**406,400**	**23,400**	**18,700**
			IU-X95	NC40 (4 FH)	4 29/32	2 7/16	10,700	278,300	897,100	21,900	17,900
					124.62	**61.91**	**14,500**	**123,800**	**399,000**	**29,700**	**24,300**
			EU-X95	NC46 (4 IF)	5 11/32	3	10,600	278,300	1,048,400	21,900	17,700
					135.73	**76.20**	**14,400**	**123,800**	**466,300**	**29,700**	**24,000**
			IU-X95	4 H90	5 1/32	2 13/16	11,000	278,300	913,700	21,900	18,400
					127.79	**71.44**	**15,000**	**123,800**	**406,400**	**29,700**	**25,000**
			EU-G105	NC46 (4 IF)	5 13/32	3	12,000	307,600	1,048,400	24,200	20,100
					137.32	**76.20**	**16,300**	**136,800**	**466,300**	**32,800**	**27,300**

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Class 2 Drill Pipe & Tool Joint Mechanical Properties

Drill Pipe Data				Class 2 Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
4 **101.6**	3.240 **82.30**	15.70 **23.36**	IU-G105	4 H90	5 1/16 **128.59**	2 13/16 **71.44**	11,700 **15,900**	307,600 **136,800**	913,700 **406,400**	24,200 **32,800**	19,600 **26,500**
			EU-S135	NC46 (4 IF)	5 17/32 **140.49**	2 5/8 **66.68**	15,000 **20,300**	395,500 **175,900**	1,247,200 **554,700**	31,100 **42,200**	25,000 **33,900**
			EU-S135	NC46 (4 IF)	5 17/32 **140.49**	2 7/8 **73.03**	15,000 **20,300**	395,500 **175,900**	1,117,600 **497,100**	31,100 **42,200**	25,000 **33,900**
4 1/2 **114.3**	3.826 **97.18**	16.60 **24.70**	IEU-E75	4 1/2 FH	5 9/32 **134.14**	3 **76.20**	10,000 **13,600**	225,700 **100,400**	976,100 **434,200**	20,900 **28,300**	16,700 **22,700**
			IEU-E75	NC46 (4 IF)	5 11/32 **135.73**	3 1/4 **82.55**	10,600 **14,400**	225,700 **100,400**	901,100 **400,800**	20,900 **28,300**	17,700 **24,000**
			IEU-E75	4 1/2 OHSW	5 3/8 **136.53**	3 3/4 **95.25**	10,300 **14,000**	225,700 **100,400**	713,900 **317,500**	20,900 **28,300**	17,200 **23,400**
			IEU-E75	NC50 (4 1/2 IF)	5 11/16 **144.46**	3 3/4 **95.25**	10,700 **14,600**	225,700 **100,400**	939,000 **417,700**	20,900 **28,300**	17,900 **24,300**
			IEU-E75	4 1/2 H90	5 9/32 **134.14**	3 1/4 **82.55**	10,600 **14,400**	225,700 **100,400**	938,400 **417,400**	20,900 **28,300**	17,700 **24,000**
			IEU-X95	4 1/2 FH	5 13/32 **137.32**	2 3/4 **69.85**	12,800 **17,300**	285,900 **127,200**	1,111,600 **494,400**	26,400 **35,900**	21,300 **28,900**
			IEU-X95	NC46 (4 IF)	5 7/16 **138.11**	3 1/4 **82.55**	12,800 **17,300**	285,900 **127,200**	901,100 **400,800**	26,400 **35,900**	21,300 **28,900**
			EU-X95	NC50 (4 1/2 IF)	5 25/32 **146.84**	3 3/4 **95.25**	13,200 **17,900**	285,900 **127,200**	939,000 **417,700**	26,400 **35,900**	22,000 **29,900**

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Class 2 Drill Pipe & Tool Joint Mechanical Properties

Drill Pipe Data				Class 2 Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
4 1/2 **114.3**	3.826 **97.18**	16.60 **24.70**	IEU-X95	4 1/2 H90	5 3/8 **136.53**	3 **76.20**	13,100 **17,700**	285,900 **127,200**	1,085,600 **482,900**	26,400 **35,900**	21,600 **29,400**
			IEU-G105	4 1/2 FH	5 15/32 **138.91**	2 3/4 **69.85**	14,200 **19,200**	316,000 **140,500**	1,111,600 **494,400**	29,200 **39,600**	23,700 **32,100**
			IEU-G105	NC46 (4 IF)	5 1/2 **139.70**	3 **76.20**	14,200 **19,300**	316,000 **140,500**	1,048,400 **466,300**	29,200 **39,600**	23,800 **32,200**
			EU-G105	NC50 (4 1/2 IF)	5 13/16 **147.64**	3 3/4 **95.25**	14,000 **19,000**	316,000 **140,500**	939,000 **417,700**	29,200 **39,600**	23,400 **31,800**
			IEU-G105	4 1/2 H90	5 7/16 **138.11**	3 **76.20**	14,600 **19,800**	316,000 **140,500**	1,085,600 **482,900**	29,200 **39,600**	24,300 **33,000**
			IEU-S135	NC46 (4 IF)	5 21/32 **143.67**	2 3/4 **69.85**	18,000 **24,500**	406,300 **180,700**	1,183,900 **526,600**	37,600 **51,000**	30,100 **40,800**
			IEU-S135	NC50 (4 1/2 IF)	5 31/32 **151.61**	3 1/2 **88.90**	18,300 **24,900**	406,300 **180,700**	1,109,900 **493,700**	37,600 **51,000**	30,600 **41,500**
	3.640 **92.46**	20.00 **29.76**	IEU-E75	4 1/2 FH	5 3/8 **136.53**	3 **76.20**	12,100 **16,400**	279,500 **124,300**	976,100 **434,200**	24,700 **33,500**	20,200 **27,300**
			IEU-E75	NC46(4 IF)	5 13/32 **137.32**	3 **76.20**	12,000 **16,300**	279,500 **124,300**	1,048,400 **466,300**	24,700 **33,500**	20,100 **27,300**
			IEU-E75	NC50 (4 1/2 IF)	5 3/4 **146.05**	3 5/8 **92.08**	12,400 **16,800**	279,500 **124,300**	1,025,900 **456,300**	24,700 **33,500**	20,600 **28,000**
			IEU-E75	4 1/2 H90	5 11/32 **135.73**	3 **76.20**	12,200 **16,500**	279,500 **124,300**	1,085,600 **482,900**	24,700 **33,500**	20,300 **27,600**

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Class 2 Drill Pipe & Tool Joint Mechanical Properties

Drill Pipe Data				Class 2 Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
4 1/2 **114.3**	3.640 **92.46**	20.00 **29.76**	IEU-X95	4 1/2 FH	5 17/32 **140.49**	2 1/2 **63.50**	15,600 **21,200**	354,000 **157,400**	1,235,300 **549,500**	31,300 **42,400**	26,100 **35,300**
			IEU-X95	NC46 (4 IF)	5 9/16 **141.29**	2 3/4 **69.85**	15,700 **21,400**	354,000 **157,400**	1,183,900 **526,600**	31,300 **42,400**	26,300 **35,600**
			EU-X95	NC50 (4 1/2 IF)	5 7/8 **149.23**	3 1/2 **88.90**	15,700 **21,300**	354,000 **157,400**	1,109,900 **493,700**	31,300 **42,400**	26,200 **35,600**
			IEU-X95	4 1/2 H90	5 15/32 **138.91**	3 **76.20**	15,400 **20,900**	354,000 **157,400**	1,085,600 **482,900**	31,300 **42,400**	25,700 **34,800**
			IEU-G105	NC46 (4 IF)	5 5/8 **142.88**	2 1/2 **63.50**	17,300 **23,400**	391,300 **174,000**	1,307,600 **581,600**	34,600 **46,900**	28,800 **39,100**
			EU-G105	NC50 (4 1/2 IF)	5 29/32 **150.02**	3 1/2 **88.90**	16,600 **22,500**	391,300 **174,000**	1,109,900 **493,700**	34,600 **46,900**	27,700 **37,500**
			EU-S135	NC50 (4 1/2 IF)	6 3/32 **154.78**	2 7/8 **73.03**	21,900 **29,700**	503,100 **223,700**	1,485,400 **660,700**	44,500 **60,300**	36,500 **49,500**
5 **127.0**	4.276 **108.61**	19.50 **29.02**	IEU-E75	NC50 (4 1/2 IF)	5 13/16 **147.64**	3 3/4 **95.25**	14,000 **19,000**	270,400 **120,200**	939,000 **417,700**	27,900 **37,900**	23,400 **31,800**
			IEU-X95	NC50 (4 1/2 IF)	5 15/16 **150.81**	3 1/2 **88.90**	17,400 **23,700**	342,500 **152,300**	1,109,900 **493,700**	35,400 **48,000**	29,100 **39,500**
			IEU-X95	5 H90	5 3/4 **146.05**	3 1/4 **82.55**	17,100 **23,200**	342,500 **152,300**	1,176,200 **523,200**	35,400 **48,000**	28,500 **38,600**
			IEU-G105	NC50 (4 1/2 IF)	6 **152.40**	3 1/4 **82.55**	19,200 **26,000**	378,600 **168,400**	1,268,900 **564,400**	39,100 **53,100**	32,000 **43,400**

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Class 2 Drill Pipe & Tool Joint Mechanical Properties

Drill Pipe Data				Class 2 Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
5 **127.0**	4.276 **108.61**	19.50 **29.02**	IEU-G105	5 H90	5 13/16 **147.64**	3 **76.20**	18,900 **25,600**	378,600 **168,400**	1,323,500 **588,700**	39,100 **53,100**	31,500 **42,700**
			IEU-S135	NC50 (4 1/2 IF)	6 3/16 **157.16**	2 3/4 **69.85**	24,600 **33,400**	486,700 **216,500**	1,551,700 **690,200**	50,300 **68,200**	41,000 **55,600**
			IEU-S135	5 1/2 FH	6 5/8 **168.28**	3 1/2 **88.90**	24,400 **33,000**	486,700 **216,500**	1,619,200 **720,200**	50,300 **68,200**	40,600 **55,100**
	4.000 **101.60**	25.60 **38.10**	IEU-E75	NC50 (4 1/2 IF)	5 15/16 **150.81**	3 1/2 **88.90**	17,400 **23,700**	358,700 **159,500**	1,109,900 **493,700**	34,900 **47,300**	29,100 **39,500**
			IEU-E75	5 1/2 FH	6 13/32 **162.72**	3 1/2 **88.90**	17,100 **23,200**	358,700 **159,500**	1,619,200 **720,200**	34,900 **47,300**	28,500 **38,700**
			IEU-X95	NC50 (4 1/2 IF)	6 3/32 **154.78**	3 **76.20**	21,900 **29,700**	454,300 **202,100**	1,416,200 **629,900**	44,200 **60,000**	36,500 **49,500**
			IEU-X95	5 1/2 FH	6 9/16 **166.69**	3 1/2 **88.90**	22,200 **30,200**	454,300 **202,100**	1,619,200 **720,200**	44,200 **60,000**	37,100 **50,300**
			IEU-G105	NC50 (4 1/2 IF)	6 5/32 **156.37**	2 3/4 **69.85**	23,700 **32,100**	502,200 **223,300**	1,551,700 **690,200**	48,900 **66,300**	39,500 **53,600**
			IEU-G105	5 1/2 FH	6 5/8 **168.28**	3 1/2 **88.90**	24,400 **33,000**	502,200 **223,300**	1,619,200 **720,200**	48,900 **66,300**	40,600 **55,100**
			IEU-S135	5 1/2 FH	6 13/16 **173.04**	3 1/4 **82.55**	30,900 **41,900**	645,700 **287,200**	1,778,200 **791,000**	62,900 **85,200**	51,500 **69,900**
5 1/2 **139.7**	4.778 **121.36**	21.90 **32.59**	IEU-E75	5 1/2 FH	6 13/32 **162.72**	4 **101.60**	17,100 **23,200**	299,500 **133,200**	1,265,800 **563,000**	34,500 **46,800**	28,500 **38,700**

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Class 2 Drill Pipe & Tool Joint Mechanical Properties

Drill Pipe Data				Class 2 Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
5 1/2 **139.7**	4.778 **121.36**	21.90 **32.59**	IEU-X95	5 1/2 FH	6 17/32 **165.89**	3 3/4 **95.25**	21,200 **28,800**	379,400 **168,700**	1,448,400 **644,200**	43,800 **59,300**	35,400 **48,000**
			IEU-X95	5 1/2 H90	6 3/32 **154.78**	3 1/2 **88.90**	21,300 **28,900**	379,400 **168,700**	1,268,800 **564,400**	43,800 **59,300**	35,500 **48,200**
			IEU-G105	5 1/2 FH	6 19/32 **167.48**	3 1/2 **88.90**	23,300 **31,600**	419,300 **186,500**	1,619,200 **720,200**	48,400 **65,600**	38,900 **52,700**
			IEU-S135	5 1/2 FH	6 13/16 **173.04**	3 **76.20**	30,900 **41,900**	539,100 **239,800**	1,925,500 **856,500**	62,200 **84,300**	51,500 **69,900**
	4.670 **118.62**	24.70 **36.76**	IEU-E75	5 1/2 FH	6 15/32 **164.31**	4 **101.60**	19,100 **25,900**	339,500 **151,000**	1,265,800 **563,000**	38,300 **52,000**	31,900 **43,300**
			IEU-X95	5 1/2 FH	6 19/32 **167.48**	3 1/2 **88.90**	23,300 **31,600**	430,000 **191,300**	1,619,200 **720,200**	48,600 **65,900**	38,900 **52,700**
			IEU-G105	5 1/2 FH	6 11/16 **169.86**	3 1/2 **88.90**	26,500 **36,000**	475,300 **211,400**	1,619,200 **720,200**	53,700 **72,800**	44,200 **60,000**
			IEU-S135	5 1/2 FH	6 7/8 **174.63**	3 **76.20**	33,100 **44,900**	611,100 **271,800**	1,925,500 **856,500**	69,000 **93,600**	55,200 **74,900**
6 5/8 **168.3**	5.965 **151.51**	25.20 **37.50**	IEU-E75	6 5/8 FH	7 3/8 **187.33**	5 **127.00**	24,100 **32,600**	337,200 **150,000**	1,448,400 **644,200**	48,400 **65,700**	40,100 **54,400**
			IEU-X95	6 5/8 FH	7 1/2 **190.50**	5 **127.00**	29,500 **40,000**	427,100 **190,000**	1,448,400 **644,200**	61,400 **83,200**	49,200 **66,700**
			IEU-G105	6 5/8 FH	7 19/32 **192.88**	4 3/4 **120.65**	33,700 **45,700**	472,100 **210,000**	1,678,100 **746,400**	67,800 **92,000**	56,200 **76,200**

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Class 2 Drill Pipe & Tool Joint Mechanical Properties

Drill Pipe Data				Class 2 Tool Joint data				Mechanical Properties			
								Tensile Yield		Torsional Yield	
Nom. Size	I.D.	Nom. Weight	Type Upset	Connection	Min. O.D.	Max. I.D.	Make-Up Torque	Pipe	Tool Joint	Pipe	Tool Joint
in. **mm**	in **mm**	lb/ft **kg/m**			in **mm**	in **mm**	ft-lb **N.m**	lb **daN**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**
6 5/8	5.965	25.20	IEU-S135	6 5/8 FH	7 25/32	4 1/4	42,300	607,000	2,102,200	87,200	70,500
168.3	**151.51**	**37.50**			**197.64**	**107.95**	**57,300**	**270,000**	**935,100**	**118,300**	**95,600**
	5.901	27.70	IEU-E75	6 5/8 FH	7 13/32	5	25,400	367,400	1,448,400	52,300	42,400
	149.89	**41.22**			**188.12**	**127.00**	**34,500**	**163,400**	**644,200**	**70,900**	**57,500**
			IEU-X95	6 5/8 FH	7 9/16	4 3/4	32,300	465,400	1,678,100	66,200	53,800
					192.09	**120.65**	**43,800**	**207,000**	**746,400**	**89,800**	**73,000**
			IEU-G105	6 5/8 FH	7 21/32	4 3/4	36,500	514,400	1,678,100	73,200	60,900
					194.47	**120.65**	**49,500**	**228,800**	**746,400**	**99,200**	**82,600**
			IEU-S135	6 5/8 FH	7 27/32	4 1/4	45,200	661,400	2,102,200	94,100	75,400
					199.23	**107.95**	**61,300**	**294,200**	**935,100**	**127,600**	**102,200**

FOR REFRENCE SEE TABLE 1, 6 & 10 (API RP7G; 16th EDITION; AUGUST 1, 1998)

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GRANT PRIDECO HIGH TORQUE (HT) / EXTREME TORQUE (XT) DRILL PIPE TOOL JOINT PROPERTIES

Pipe O.D.	Pipe I.D.	Nom. Weight	Conn. Type	Tool Joint O.D.	Tool Joint I.D.	T.J.** Tensile Yield Strength	T.J.** Torque Yield Strength	Maximum Make Up Torque	Adj. Weight w/T.J.	Drift Diameter	Capacity w/T.J.	Displ. w/T.J.
in. **mm**	in. **mm**	lb/ft **kg/m**		in. **mm**	in. **mm**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	lb/ft **kg/m**	in. **mm**	US gal/ft **Litre/m**	US gal/ft **Litre/m**
2 3/8 **60.3**	1.815 **46.10**	6.65 **9.90**	HT26	3 3/8 **85.73**	1 3/4 **44.45**	313,700 **139,500**	8,800 **11,900**	5,300 **7,100**	7.27 **10.82**	1 5/8 **41.28**	0.134 **1.662**	0.112 **1.386**
			XT24	3 1/8 **79.38**	1 1/2 **38.10**	261,500 **116,300**	9,800 **13,200**	5,900 **7,900**	7.35 **10.93**	1 3/8 **34.93**	0.131 **1.633**	0.113 **1.400**
			XT26	3 3/8 **85.73**	1 3/4 **44.45**	291,000 **129,400**	11,800 **15,900**	7,100 **9,600**	7.43 **11.05**	1 5/8 **41.28**	0.134 **1.661**	0.114 **1.416**
2 7/8 **73.0**	2.441 **62.00**	6.85 **10.19**	HT26	3 3/8 **85.73**	1 3/4 **44.45**	313,700 **139,500**	8,800 **11,900**	5,300 **7,100**	7.32 **10.89**	1 5/8 **41.28**	0.236 **2.933**	0.112 **1.390**
			XT26	3 3/8 **85.73**	1 3/4 **44.45**	291,000 **129,400**	11,800 **15,900**	7,100 **9,600**	7.48 **11.12**	1 5/8 **41.28**	0.235 **2.918**	0.114 **1.420**
			HT31	4 **101.60**	2 5/32 **54.76**	434,600 **193,300**	12,400 **16,800**	7,600 **10,300**	7.92 **11.79**	2 1/32 **51.59**	0.240 **2.977**	0.121 **1.499**
			XT31	4 **101.60**	2 5/32 **54.76**	402,600 **179,000**	17,700 **23,900**	10,600 **14,300**	8.07 **12.00**	2 1/32 **51.59**	0.239 **2.973**	0.123 **1.533**
			HT31	4 **101.60**	2 5/32 **54.76**	434,600 **193,300**	12,400 **16,800**	7,600 **10,300**	7.92 **11.79**	2 1/32 **51.59**	0.240 **2.977**	0.121 **1.499**
			XT31	4 **101.60**	2 5/32 **54.76**	402,600 **179,000**	17,700 **23,900**	10,600 **14,300**	8.10 **12.06**	2 1/32 **51.59**	0.239 **2.973**	0.123 **1.533**
			HT26	3 1/2 **88.90**	1 1/2 **38.10**	390,300 **173,600**	12,200 **16,500**	7,300 **9,800**	7.66 **11.39**	1 3/8 **34.93**	0.234 **2.907**	0.117 **1.454**
			XT26	3 3/8 **85.73**	1 3/4 **44.45**	291,000 **129,400**	11,800 **15,900**	7,100 **9,600**	7.48 **11.12**	1 5/8 **41.28**	0.235 **2.918**	0.114 **1.420**
			XT31	4 **101.60**	2 5/32 **54.76**	402,600 **179,000**	17,700 **23,900**	10,600 **14,300**	8.07 **12.00**	2 1/32 **51.59**	0.239 **2.973**	0.123 **1.533**
	2.151 **54.64**	10.4 **15.48**	HTPAC	3 1/8 **79.38**	1 1/2 **38.10**	273,100 **121,400**	8,600 **11,600**	5,100 **6,900**	10.51 **15.64**	1 3/8 **34.93**	0.183 **2.272**	0.161 **1.997**
			2-3/8 HT-SLH90	3 1/8 **79.38**	1.975 **50.17**	212,200 **94,300**	7,500 **10,100**	4,500 **6,100**	10.29 **15.31**	1.850 **46.99**	0.187 **2.322**	0.156 **1.937**
			HT26	3 1/2 **88.90**	1 1/2 **38.10**	390,300 **173,600**	12,200 **16,500**	7,300 **9,800**	10.89 **16.20**	1 3/8 **34.93**	0.183 **2.273**	0.167 **2.068**

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GRANT PRIDECO HIGH TORQUE (HT) / EXTREME TORQUE (XT) DRILL PIPE TOOL JOINT PROPERTIES

Pipe O.D.	Pipe I.D.	Nom. Weight	Conn. Type	Tool Joint O.D.	Tool Joint I.D.	T.J.** Tensile Yield Strength	T.J.** Torque Yield Strength	Maximum Make Up Torque	Adj. Weight w/T.J.	Drift Diameter	Capacity w/T.J.	Displ. w/T.J.
in. **mm**	in. **mm**	lb/ft **kg/m**		in. **mm**	in. **mm**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	lb/ft **kg/m**	in. **mm**	US gal/ft **Litre/m**	US gal/ft **Litre/m**
2 7/8 **73.0**	2.151 **54.64**	10.4 **15.48**	HT31	4 1/8 **104.78**	2 5/32 **54.76**	434,600 **193,300**	13,500 **18,300**	8,100 **10,900**	11.27 **16.78**	2 1/32 **51.59**	0.189 **2.345**	0.172 **2.142**
			XT26	3 1/2 **88.90**	1 1/2 **38.10**	291,000 **129,400**	11,800 **15,900**	7,100 **9,600**	11.05 **16.45**	1 3/8 **34.93**	0.182 **2.261**	0.169 **2.100**
			XT31	4 **101.60**	2 5/32 **54.76**	402,600 **179,000**	17,700 **23,900**	10,600 **14,300**	11.25 **16.74**	2 1/32 **51.59**	0.189 **2.345**	0.172 **2.138**
			HT26	3 5/8 **92.08**	1 1/2 **38.10**	390,300 **173,600**	13,200 **17,800**	7,900 **10,700**	11.03 **16.42**	1 3/8 **34.93**	0.183 **2.272**	0.169 **2.096**
			HT31	4 1/8 **104.78**	2 5/32 **54.76**	434,600 **193,300**	13,500 **18,300**	8,100 **10,900**	11.27 **16.78**	2 1/32 **51.59**	0.189 **2.345**	0.172 **2.142**
			HTPAC	3 1/8 **79.38**	1 1/2 **38.10**	273,100 **121,400**	8,600 **11,600**	5,100 **6,900**	10.51 **15.64**	1 3/8 **34.93**	0.183 **2.272**	0.161 **1.997**
			HT31	4 1/8 **104.78**	2 **50.80**	495,700 **220,400**	16,300 **22,000**	9,800 **13,200**	11.44 **17.03**	1 7/8 **47.63**	0.187 **2.324**	0.175 **2.173**
			XT26	3 1/2 **88.90**	1 1/2 **38.10**	291,000 **129,400**	11,800 **15,900**	7,100 **9,600**	11.05 **16.45**	1 3/8 **34.93**	0.182 **2.261**	0.169 **2.100**
3 1/2 **88.9**	2.992 **76.00**	9.50 **14.14**	HT31	4 1/8 **104.78**	2 1/8 **53.98**	447,100 **198,800**	14,100 **19,100**	8,500 **11,500**	10.70 **15.92**	2 **50.80**	0.354 **4.396**	0.164 **2.032**
			HT38	4 3/4 **120.65**	2 11/16 **68.26**	587,300 **261,200**	25,300 **34,300**	15,200 **20,600**	11.38 **16.93**	2 9/16 **65.09**	0.360 **4.473**	0.174 **2.161**
			XT31	4 **101.60**	2 1/8 **53.98**	415,100 **184,600**	18,300 **24,800**	11,000 **14,900**	10.68 **15.90**	2 **50.80**	0.353 **4.381**	0.163 **2.029**
			XT38	4 5/8 **117.48**	2 13/16 **71.45**	472,700 **210,200**	23,900 **32,400**	14,300 **19,300**	10.92 **16.25**	2 11/16 **68.28**	0.362 **4.499**	0.167 **2.075**
			HT31	4 1/8 **104.78**	2 **50.80**	495,700 **220,400**	16,300 **22,000**	9,800 **13,200**	10.83 **16.12**	1 7/8 **47.63**	0.353 **4.380**	0.166 **2.058**
			XT31	4 **101.60**	2 **50.80**	463,700 **206,200**	20,100 **27,200**	12,100 **16,400**	10.82 **16.11**	1 7/8 **47.63**	0.351 **4.363**	0.166 **2.056**
	2.764 **70.21**	13.30 **19.79**	HT31	4 1/8 **104.78**	2 **50.80**	495,700 **220,400**	16,300 **22,000**	9,800 **13,200**	13.99 **20.82**	1 7/8 **47.63**	0.302 **3.756**	0.214 **2.658**

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GRANT PRIDECO HIGH TORQUE (HT) / EXTREME TORQUE (XT) DRILL PIPE TOOL JOINT PROPERTIES

Pipe O.D.	Pipe I.D.	Nom. Weight	Conn. Type	Tool Joint O.D.	Tool Joint I.D.	T.J.** Tensile Yield Strength	T.J.** Torque Yield Strength	Maximum Make Up Torque	Adj. Weight w/T.J.	Drift Diameter	Capacity w/T.J.	Displ. w/T.J.
in. **mm**	in. **mm**	lb/ft **kg/m**		in. **mm**	in. **mm**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	lb/ft **kg/m**	in. **mm**	US gal/ft **Litre/m**	US gal/ft **Litre/m**
3 1/2 **88.9**	2.764 **70.21**	13.30 **19.79**	HT38	4 3/4 **120.65**	2 11/16 **68.26**	587,300 **261,200**	25,300 **34,300**	15,200 **20,600**	14.51 **21.59**	2 9/16 **65.09**	0.310 **3.856**	0.222 **2.756**
			XT31	4 **101.60**	2 1/8 **53.98**	415,100 **184,600**	18,300 **24,800**	11,000 **14,900**	13.82 **20.57**	2 **50.80**	0.303 **3.762**	0.211 **2.626**
			XT38	4 3/4 **120.65**	2 11/16 **68.28**	537,500 **239,000**	27,900 **37,800**	16,700 **22,600**	14.47 **21.54**	2 9/16 **65.10**	0.310 **3.856**	0.221 **2.749**
		SS-95*	XT38	4 7/8 **123.83**	2 9/16 **65.10**	549,700 **244,500**	29,000 **39,300**	17,400 **23,500**	15.00 **22.32**	2 7/16 **61.91**	0.309 **3.838**	0.229 **2.844**
			XT31	4 1/8 **104.78**	2 **50.80**	463,700 **206,200**	20,900 **28,300**	12,500 **16,900**	14.16 **21.07**	1 7/8 **47.63**	0.301 **3.743**	0.217 **2.689**
			HT38	4 3/4 **120.65**	2 9/16 **65.09**	649,200 **288,700**	26,900 **36,400**	16,100 **21,800**	14.69 **21.86**	2 7/16 **61.91**	0.309 **3.832**	0.225 **2.791**
			HT38	4 7/8 **123.83**	2 9/16 **65.09**	649,200 **288,700**	26,900 **36,400**	16,100 **21,800**	14.93 **22.22**	2 7/16 **61.91**	0.309 **3.832**	0.228 **2.832**
			XT38	4 5/8 **117.48**	2 13/16 **71.45**	472,700 **210,200**	23,900 **32,400**	14,300 **19,300**	14.07 **20.93**	2 11/16 **68.28**	0.312 **3.881**	0.215 **2.672**
	2.602 **66.09**	15.50 **23.07**	HT38	4 3/4 **120.65**	2 11/16 **68.26**	587,300 **261,200**	25,300 **34,300**	15,200 **20,600**	16.60 **24.70**	2 9/16 **65.09**	0.278 **3.447**	0.254 **3.153**
			XT38	4 3/4 **120.65**	2 9/16 **65.10**	599,400 **266,600**	31,500 **42,700**	18,900 **25,600**	16.73 **24.90**	2 7/16 **61.93**	0.276 **3.423**	0.256 **3.179**
		SS-95*	XT38	4 7/8 **123.83**	2 9/16 **65.09**	549,700 **244,500**	29,000 **39,300**	17,400 **23,500**	17.03 **25.34**	2 7/16 **61.93**	0.276 **3.428**	0.261 **3.241**
			HT38	4 3/4 **120.65**	2 9/16 **65.09**	649,200 **288,700**	26,900 **36,400**	16,100 **21,800**	16.77 **24.95**	2 7/16 **61.91**	0.276 **3.423**	0.256 **3.185**
			HT38	4 3/4 **120.65**	2 7/16 **61.91**	708,100 **314,900**	28,400 **38,500**	17,000 **23,000**	16.72 **24.89**	2 5/16 **58.74**	0.274 **3.403**	0.256 **3.177**
			XT39	5 **127.00**	2 9/16 **65.10**	725,900 **322,800**	40,600 **55,000**	24,400 **33,000**	17.20 **25.60**	2 7/16 **61.93**	0.276 **3.423**	0.263 **3.268**

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GRANT PRIDECO HIGH TORQUE (HT) / EXTREME TORQUE (XT) DRILL PIPE TOOL JOINT PROPERTIES

Pipe O.D.	Pipe I.D.	Nom. Weight	Conn. Type	Tool Joint O.D.	Tool Joint I.D.	T.J.** Tensile Yield Strength	T.J.** Torque Yield Strength	Maximum Make Up Torque	Adj. Weight w/T.J.	Drift Diameter	Capacity w/T.J.	Displ. w/T.J.
in. **mm**	in. **mm**	lb/ft **kg/m**		in. **mm**	in. **mm**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	lb/ft **kg/m**	in. **mm**	US gal/ft **Litre/m**	US gal/ft **Litre/m**
4 **101.6**	3.476 **88.29**	11.85 **17.63**	HT38	4 3/4 **120.65**	2 11/16 **68.26**	587,300 **261,200**	25,300 **34,300**	15,200 **20,600**	13.02 **19.37**	2 9/16 **65.09**	0.479 **5.946**	0.199 **2.473**
			XT38	4 3/4 **120.65**	2 11/16 **68.28**	537,500 **239,000**	27,900 **37,800**	16,700 **22,600**	12.93 **19.24**	2 9/16 **65.10**	0.479 **5.948**	0.198 **2.456**
			XT39	5 **127.00**	2 7/8 **73.03**	566,000 **251,700**	30,800 **41,700**	18,500 **25,000**	13.11 **19.51**	2 3/4 **69.85**	0.482 **5.982**	0.200 **2.490**
			HT38	4 3/4 **120.65**	2 9/16 **65.09**	649,200 **288,700**	26,900 **36,400**	16,100 **21,800**	13.20 **19.65**	2 7/16 **61.91**	0.477 **5.922**	0.202 **2.508**
			HT38	4 3/4 **120.65**	2 7/16 **61.91**	708,100 **314,900**	28,400 **38,500**	17,000 **23,000**	13.38 **19.91**	2 5/16 **58.74**	0.475 **5.900**	0.205 **2.542**
	3.340 **84.84**	14.00 **20.83**	HT38	4 3/4 **120.65**	2 11/16 **68.26**	587,300 **261,200**	25,300 **34,300**	15,200 **20,600**	15.23 **22.66**	2 9/16 **65.09**	0.444 **5.510**	0.233 **2.893**
			HT40	5 1/4 **133.35**	2 13/16 **71.44**	711,600 **316,500**	32,000 **43,300**	19,200 **26,000**	15.88 **23.63**	2 11/16 **68.26**	0.446 **5.536**	0.243 **3.016**
			XT38	4 3/4 **120.65**	2 11/16 **68.28**	537,500 **239,000**	27,900 **37,800**	16,700 **22,600**	15.20 **22.61**	2 9/16 **65.10**	0.444 **5.513**	0.232 **2.887**
			XT39	5 **127.00**	2 13/16 **71.45**	599,200 **266,500**	32,900 **44,600**	19,700 **26,700**	15.47 **23.03**	2 11/16 **68.28**	0.446 **5.535**	0.237 **2.939**
			HT38	5 **127.00**	2 9/16 **65.09**	649,200 **288,700**	29,600 **40,100**	17,800 **24,100**	15.89 **23.65**	2 7/16 **61.91**	0.441 **5.483**	0.243 **3.020**
			HT38	4 7/8 **123.83**	2 7/16 **61.91**	707,800 **314,800**	32,100 **43,500**	19,300 **26,100**	15.75 **23.44**	2 5/16 **58.74**	0.440 **5.460**	0.241 **2.993**
			HT38	4 7/8 **123.83**	2 9/16 **65.09**	649,200 **288,700**	29,500 **39,900**	17,700 **23,900**	15.59 **23.20**	2 7/16 **61.91**	0.442 **5.489**	0.238 **2.956**
			HT38	5 **127.00**	2 7/16 **61.91**	708,100 **314,900**	33,000 **44,700**	19,800 **26,800**	16.07 **23.92**	2 5/16 **58.74**	0.440 **5.460**	0.246 **3.053**
			HT40	5 1/4 **133.35**	2 11/16 **68.26**	776,400 **345,300**	35,900 **48,600**	21,500 **29,100**	16.07 **23.91**	2 9/16 **65.09**	0.444 **5.512**	0.246 **3.052**
			XT38	5 **127.00**	2 9/16 **65.10**	599,400 **266,600**	31,800 **43,100**	19,100 **25,800**	15.85 **23.59**	2 7/16 **61.93**	0.442 **5.486**	0.242 **3.011**

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GRANT PRIDECO HIGH TORQUE (HT) / EXTREME TORQUE (XT) DRILL PIPE TOOL JOINT PROPERTIES

Pipe O.D.	Pipe I.D.	Nom. Weight	Conn. Type	Tool Joint O.D.	Tool Joint I.D.	T.J.** Tensile Yield Strength	T.J.** Torque Yield Strength	Maximum Make Up Torque	Adj. Weight w/T.J.	Drift Diameter	Capacity w/T.J.	Displ. w/T.J.
in. **mm**	in. **mm**	lb/ft **kg/m**		in. **mm**	in. **mm**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	lb/ft **kg/m**	in. **mm**	US gal/ft **Litre/m**	US gal/ft **Litre/m**
4 **101.6**	3.240 **82.30**	15.70 **23.36**	HT40	5 1/4 **133.35**	2 13/16 **71.44**	711,600 **316,500**	32,000 **43,300**	19,200 **26,000**	17.45 **25.96**	2 11/16 **68.26**	0.421 **5.227**	0.267 **3.315**
			XT39	5 **127.00**	2 13/16 **71.45**	599,200 **266,500**	32,900 **44,600**	19,700 **26,700**	17.04 **25.36**	2 11/16 **68.28**	0.446 **5.535**	0.261 **3.238**
			XT40	5 1/4 **133.35**	2 13/16 **71.45**	751,400 **334,200**	37,500 **50,800**	22,500 **30,500**	17.54 **26.10**	2 11/16 **68.28**	0.445 **5.533**	0.268 **3.332**
			HT38	4 7/8 **123.83**	2 9/16 **65.09**	649,200 **288,700**	29,500 **39,900**	17,700 **23,900**	17.27 **25.70**	2 7/16 **61.91**	0.417 **5.176**	0.264 **3.279**
			HT40	5 1/2 **139.70**	2 9/16 **65.09**	838,300 **372,800**	40,000 **54,200**	24,000 **32,500**	18.34 **27.29**	2 7/16 **61.91**	0.417 **5.176**	0.280 **3.483**
			XT39	5 **127.00**	2 11/16 **68.28**	664,000 **295,300**	36,900 **50,000**	22,100 **29,900**	17.24 **25.65**	2 9/16 **65.10**	0.444 **5.510**	0.264 **3.274**
4 1/2 **114.3**	3.826 **97.18**	16.60 **24.70**	HT46	6 1/4 **158.75**	3 1/4 **82.55**	901,200 **400,800**	48,500 **65,700**	29,100 **39,400**	19.62 **29.20**	3 1/8 **79.38**	0.585 **7.268**	0.300 **3.728**
			HT50	6 1/4 **158.75**	3 3/4 **95.25**	939,100 **417,700**	52,700 **71,400**	31,600 **42,800**	18.90 **28.13**	3 5/8 **92.08**	0.596 **7.397**	0.289 **3.591**
			XT40	5 1/4 **133.35**	3 **76.20**	648,900 **288,600**	22,800 **30,900**	12,500 **16,900**	17.94 **26.69**	2 7/8 **73.03**	0.581 **7.219**	0.274 **3.408**
			XT46	6 **152.40**	3 1/2 **88.90**	886,500 **394,300**	57,000 **77,200**	34,200 **46,300**	18.68 **27.79**	3 3/8 **85.73**	0.590 **7.328**	0.286 **3.548**
			XT50	6 3/8 **161.93**	3 3/4 **95.25**	1,085,500 **482,800**	76,400 **103,500**	45,800 **62,000**	19.34 **28.78**	3 5/8 **92.08**	0.596 **7.396**	0.296 **3.675**
			HT50	6 3/8 **161.93**	3 1/2 **88.90**	1,109,900 **493,700**	65,700 **89,000**	39,400 **53,400**	19.71 **29.33**	3 3/8 **85.73**	0.590 **7.332**	0.301 **3.744**
			XT40	5 1/4 **133.35**	2 13/16 **71.44**	751,600 **334,300**	29,400 **39,800**	17,400 **23,500**	18.24 **27.14**	2 11/16 **68.26**	0.578 **7.181**	0.279 **3.465**
			XT50	6 3/8 **161.93**	3 1/2 **88.90**	1,256,300 **558,800**	82,400 **111,700**	49,400 **66,900**	19.85 **29.54**	3 3/8 **85.73**	0.590 **7.329**	0.304 **3.772**

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GRANT PRIDECO HIGH TORQUE (HT) / EXTREME TORQUE (XT) DRILL PIPE TOOL JOINT PROPERTIES

Pipe O.D.	Pipe I.D.	Nom. Weight	Conn. Type	Tool Joint O.D.	Tool Joint I.D.	T.J.** Tensile Yield Strength	T.J.** Torque Yield Strength	Maximum Make Up Torque	Adj. Weight w/T.J.	Drift Diameter	Capacity w/T.J.	Displ. w/T.J.
4 1/2	3.64	20.00	HT46	6 1/4	3 1/4	901,200	48,500	29,100	22.93	3 1/8	0.533	0.351
114.3	**92.46**	**29.76**		**158.75**	**82.55**	**400,800**	**65,700**	**39,400**	**34.13**	**79.38**	**6.615**	**4.357**
			HT50	6 1/4	3 3/4	939,100	52,700	31,600	22.25	3 5/8	0.543	0.340
				158.75	**95.25**	**417,700**	**71,400**	**42,800**	**33.11**	**92.08**	**6.742**	**4.227**
			XT46	6	3 1/2	886,500	57,000	34,200	21.99	3 3/8	0.538	0.336
				152.40	**88.90**	**394,300**	**77,200**	**46,300**	**32.72**	**85.73**	**6.676**	**4.177**
			XT50	6 3/8	3 1/2	1,256,300	82,400	49,400	23.17	3 3/8	0.538	0.354
				161.93	**88.90**	**558,800**	**111,700**	**66,900**	**34.47**	**85.73**	**6.677**	**4.401**
			HT46	6 1/4	3	1,048,400	58,700	35,200	23.38	2 7/8	0.528	0.358
				158.75	**76.20**	**466,300**	**79,500**	**47,700**	**34.79**	**73.03**	**6.558**	**4.441**
			HT50	6 3/8	3 1/2	1,109,900	65,700	39,400	23.03	3 3/8	0.538	0.352
				161.93	**88.90**	**493,700**	**89,000**	**53,400**	**34.27**	**85.73**	**6.678**	**4.375**
5	4.276	19.50	HT50	6 5/8	3 3/4	939,100	53,300	32,000	22.61	3 5/8	0.734	0.346
127.0	**108.61**	**29.02**		**168.28**	**95.25**	**417,700**	**72,200**	**43,300**	**33.65**	**92.08**	**9.111**	**4.296**
			XT46	6	3 1/2	886,500	57,000	34,200	21.71	3 3/8	0.729	0.332
				152.40	**88.90**	**394,300**	**77,200**	**46,300**	**32.31**	**85.73**	**9.049**	**4.124**
			XT50	6 1/2	4	902,900	63,700	38,200	21.88	3 7/8	0.739	0.335
				165.10	**101.60**	**401,600**	**86,300**	**51,700**	**32.57**	**98.43**	**9.180**	**4.157**
			HT50	6 5/8	3 1/2	1,109,900	66,200	39,700	23.12	3 3/8	0.728	0.354
				168.28	**88.90**	**493,700**	**89,700**	**53,800**	**34.41**	**85.73**	**9.046**	**4.392**
			XT50	6 1/2	3 3/4	1,085,500	78,200	46,900	22.43	3 5/8	0.733	0.343
				165.10	**95.25**	**482,800**	**106,000**	**63,500**	**33.38**	**92.08**	**9.108**	**4.262**
	4.000	25.60	HT50	6 5/8	3 1/2	1,109,900	66,200	39,700	28.57	3 3/8	0.642	0.437
	101.60	**38.10**		**168.28**	**88.90**	**493,700**	**89,700**	**53,800**	**42.52**	**85.73**	**7.971**	**5.428**
			XT50	6 5/8	3 3/4	1,085,500	78,400	47,000	28.20	3 5/8	0.647	0.431
				168.28	**95.25**	**482,800**	**106,200**	**63,700**	**41.97**	**92.08**	**8.035**	**5.357**
			HT50	6 5/8	3 1/4	1,269,000	78,000	46,800	29.05	3 1/8	0.637	0.444
				168.28	**82.55**	**564,400**	**105,700**	**63,400**	**43.22**	**79.38**	**7.910**	**5.518**
			HT50	6 5/8	3	1,416,200	88,800	53,300	29.49	2 7/8	0.632	0.451
				168.28	**76.20**	**629,900**	**120,300**	**72,200**	**43.88**	**73.03**	**7.853**	**5.601**
			XT50	6 5/8	3 1/2	1,256,300	91,900	55,100	28.72	3 3/8	0.641	0.439
				168.28	**88.90**	**558,800**	**124,500**	**74,700**	**42.74**	**85.73**	**7.967**	**5.456**

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GRANT PRIDECO HIGH TORQUE (HT) / EXTREME TORQUE (XT) DRILL PIPE TOOL JOINT PROPERTIES

Pipe O.D.	Pipe I.D.	Nom. Weight	Conn. Type	Tool Joint O.D.	Tool Joint I.D.	T.J.** Tensile Yield Strength	T.J.** Torque Yield Strength	Maximum Make Up Torque	Adj. Weight w/T.J.	Drift Diameter	Capacity w/T.J.	Displ. w/T.J.
in. **mm**	in. **mm**	lb/ft **kg/m**		in. **mm**	in. **mm**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	lb/ft **kg/m**	in. **mm**	US gal/ft **Litre/m**	US gal/ft **Litre/m**
5 1/2 **139.70**	4.778 **121.36**	21.90 **32.59**	HT55	7 **177.80**	4 **101.60**	1,265,800 **563,000**	77,200 **104,600**	46,300 **62,700**	25.44 **37.86**	3 7/8 **98.43**	0.911 **11.314**	0.389 **4.833**
			XT54	6 3/4 **171.45**	4 1/4 **107.95**	960,700 **427,300**	70,700 **95,800**	42,400 **57,400**	24.08 **35.83**	4 1/8 **104.78**	0.917 **11.394**	0.368 **4.574**
			XT57	7 **177.80**	4 3/8 **111.13**	1,107,100 **492,400**	85,600 **116,000**	51,400 **69,600**	24.45 **36.39**	4 1/4 **107.95**	0.920 **11.431**	0.374 **4.645**
			HT55	7 3/8 **187.33**	4 **101.60**	1,265,800 **563,000**	78,000 **105,700**	46,800 **63,400**	26.48 **39.41**	3 7/8 **98.43**	0.911 **11.314**	0.405 **5.030**
			XT57	7 **177.80**	4 1/4 **107.95**	1,208,700 **537,600**	94,300 **127,800**	56,600 **76,700**	24.76 **36.85**	4 1/8 **104.78**	0.917 **11.390**	0.379 **4.704**
	4.670 **118.62**	24.70 **36.76**	HT55	7 **177.80**	4 **101.60**	1,265,800 **563,000**	77,200 **104,600**	46,300 **62,700**	27.88 **41.50**	3 7/8 **98.43**	0.872 **10.835**	0.427 **5.297**
			XT54	6 3/4 **171.45**	4 1/4 **107.95**	960,700 **427,300**	70,700 **95,800**	42,400 **57,400**	26.62 **39.61**	4 1/8 **104.78**	0.879 **10.914**	0.407 **5.057**
			XT57	7 **177.80**	4 3/8 **111.13**	1,107,100 **492,400**	85,600 **116,000**	51,400 **69,600**	26.99 **40.17**	4 1/4 **107.95**	0.882 **10.951**	0.413 **5.128**
			HT55	7 3/8 **187.33**	4 **101.60**	1,265,800 **563,000**	78,000 **105,700**	46,800 **63,400**	28.81 **42.87**	3 7/8 **98.43**	0.873 **10.842**	0.441 **5.477**
			HT55	7 **177.80**	3 3/4 **95.25**	1,448,400 **644,200**	87,700 **118,900**	52,600 **71,300**	28.44 **42.32**	3 5/8 **92.08**	0.867 **10.763**	0.435 **5.402**
			XT54	6 3/4 **171.45**	4 **101.60**	1,155,100 **513,800**	86,800 **117,600**	52,100 **70,600**	27.20 **40.48**	3 7/8 **98.43**	0.873 **10.839**	0.416 **5.167**
			XT57	7 **177.80**	4 1/4 **107.95**	1,208,700 **537,600**	94,300 **127,800**	56,600 **76,700**	27.30 **40.62**	4 1/8 **104.78**	0.879 **10.911**	0.418 **5.186**
5 7/8 **149.2**	5.153 **130.89**	23.40 **34.82**	XT57	7 **177.80**	4 1/4 **107.95**	1,208,700 **537,600**	94,300 **127,800**	56,600 **76,700**	26.46 **39.38**	4 1/8 **104.78**	1.059 **13.146**	0.405 **5.027**
	5.045 **128.14**	26.30 **39.14**	XT57	7 **177.80**	4 1/4 **107.95**	1,208,700 **537,600**	94,300 **127,800**	56,600 **76,700**	29.10 **43.31**	4 1/8 **104.78**	1.017 **12.628**	0.445 **5.529**
			XT57	7 **177.80**	4 **101.60**	1,403,100 **624,100**	106,200 **143,900**	63,700 **86,300**	29.68 **44.17**	3 7/8 **98.43**	1.011 **12.553**	0.454 **5.639**

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GRANT PRIDECO HIGH TORQUE (HT) / EXTREME TORQUE (XT) DRILL PIPE TOOL JOINT PROPERTIES

Pipe O.D.	Pipe I.D.	Nom. Weight	Conn. Type	Tool Joint O.D.	Tool Joint I.D.	T.J.** Tensile Yield Strength	T.J.** Torque Yield Strength	Maximum Make Up Torque	Adj. Weight w/T.J.	Drift Diameter	Capacity w/T.J.	Displ. w/T.J.
in. **mm**	in. **mm**	lb/ft **kg/m**		in. **mm**	in. **mm**	lb **daN**	ft-lb **N.m**	ft-lb **N.m**	lb/ft **kg/m**	in. **mm**	US gal/ft **Litre/m**	US gal/ft **Litre/m**
6 5/8 **168.3**	5.965 **151.51**	25.20 **37.50**	HT65	8 **203.20**	5 **127.00**	1,448,900 **644,500**	99,900 **135,400**	59,900 **81,200**	29.40 **43.75**	4 7/8 **123.83**	1.420 **17.630**	0.450 **5.585**
			XT65	8 **203.20**	5 **127.00**	1,543,700 **686,600**	135,300 **183,400**	81,200 **110,000**	28.35 **42.19**	4 7/8 **123.83**	1.418 **17.606**	0.434 **5.386**
	5.901 **149.89**	27.70 **41.22**	HT65	8 **203.20**	5 **127.00**	1,448,900 **644,500**	99,900 **135,400**	59,900 **81,200**	31.22 **46.46**	4 7/8 **123.83**	1.391 **17.274**	0.478 **5.930**
			XT65	8 **203.20**	5 **127.00**	1,543,700 **686,600**	135,300 **183,400**	81,200 **110,000**	30.16 **44.88**	4 7/8 **123.83**	1.389 **17.252**	0.461 **5.730**
			HT65	8 1/4 **209.55**	5 **127.00**	1,448,900 **644,500**	100,200 **135,800**	60,100 **81,400**	32.04 **47.68**	4 7/8 **123.83**	1.391 **17.274**	0.490 **6.085**

Note:

* The tool joints for SS-95 pipe are manufactured from a special grade to meet Nace H_2S requirements.

** The values given in this table are for the tool joints only, which is independent of the pipe grade. The tensile/torque values to yield the pipe are the lower of the tool joint values, given in this table, and the premium drill pipe tube torque/tensile values. These values for the different pipe grades are listed in the previous table in this section. (See next table for V-150 pipe.)

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GRANT PRIDECO SPECIAL GRADE V-150 DRILL PIPE PROPERTIES

Size O.D.	Nom. Weight	New Pipe Data				Premium Pipe Data			
		Torsional Yield Strength	Tensile Yield Strength	Internal Pressure	Collapse Pressure	Torsional Yield Strength	Tensile Yield Strength	Internal Pressure	Collapse Pressure
in. mm	lb/ft kg/m	ft-lb N m	lb daN	psi MPa	psi MPa	ft-lb N m	lb daN	psi MPa	psi MPa
2 3/8	4.85	9,500	195,600	21,000	20,660	7,400	153,700	19,200	13,710
60.3	**7.22**	**12,800**	**87,000**	**144.8**	**142.4**	**10,000**	**68,300**	**132.4**	**94.5**
	6.65	12,500	276,400	30,940	31,190	9,600	215,200	28,200	26,750
	9.90	**16,900**	**122,900**	**213.3**	**215.0**	**13,000**	**95,700**	**194.4**	**184.4**
2 7/8	6.85	16,200	271,800	19,810	18,390	12,600	213,800	18,110	11,780
73.0	**10.19**	**21,900**	**120,900**	**136.6**	**126.8**	**17,000**	**95,100**	**124.9**	**81.2**
	10.40	23,100	428,700	33,050	33,010	17,700	33,300	30,210	28,440
	15.48	**31,300**	**190,600**	**227.9**	**227.6**	**23,900**	**14,800**	**208.3**	**196.1**
3 1/2	9.50	28,300	388,500	19,050	16,940	22,100	305,900	17,410	10,540
88.9	**14.14**	**38,300**	**172,800**	**131.3**	**116.8**	**29,900**	**136,000**	**120.0**	**72.7**
	13.30	37,100	543,100	27,600	28,220	28,700	424,300	25,230	24,020
	19.79	**50,300**	**241,500**	**190.3**	**194.6**	**38,900**	**188,700**	**174.0**	**165.6**
	15.50	42,200	645,500	33,670	33,540	32,200	501,200	30,780	28,940
	23.07	**57,200**	**287,100**	**232.1**	**231.3**	**43,600**	**222,900**	**212.2**	**199.5**
4	11.85	38,900	461,500	17,190	13,400	30,600	364,000	15,720	7,560
101.6	**17.63**	**52,700**	**205,200**	**118.5**	**92.4**	**41,400**	**161,900**	**108.4**	**52.1**
	14.00	46,600	570,700	21,650	21,910	36,300	448,300	19,800	14,780
	20.83	**63,100**	**253,800**	**149.3**	**151.1**	**49,200**	**199,400**	**136.5**	**101.9**
	15.70	51,600	648,200	24,930	25,790	40,100	507,700	22,800	20,160
	23.36	**69,900**	**288,300**	**171.9**	**177.8**	**54,300**	**225,800**	**157.2**	**139.0**
4 1/2	16.60	61,600	661,100	19,650	18,100	48,278	520,300	17,970	11,530
114.3	**24.70**	**83,500**	**294,000**	**135.5**	**124.8**	**65,400**	**231,400**	**123.9**	**79.5**
	20.00	73,800	824,700	25,080	25,920	57,300	645,800	22,930	20,400
	29.76	**100,000**	**366,800**	**172.9**	**178.7**	**77,600**	**287,200**	**158.1**	**140.7**
5	19.50	82,300	791,200	19,000	16,850	64,500	623,000	17,370	10,470
127.0	**29.02**	**111,500**	**351,900**	**131.0**	**116.2**	**87,400**	**277,100**	**119.8**	**72.2**
	25.60	104,500	1,060,300	26,250	27,000	81,000	829,300	24,000	22,320
	38.10	**141,600**	**471,600**	**181.0**	**186.2**	**109,800**	**368,800**	**165.5**	**153.9**
5 1/2	21.90	101,400	874,200	17,230	13,470	79,700	689,500	15,750	7,610
139.7	**32.59**	**137,400**	**388,800**	**118.8**	**92.9**	**108,000**	**306,700**	**108.6**	**52.5**
	24.70	113,100	994,400	19,800	18,380	88,600	782,500	18,100	11,770
	36.76	**153,300**	**442,300**	**136.5**	**126.7**	**120,100**	**348,000**	**124.8**	**81.2**
5 7/8	23.40	117,200	938,000	16,130	11,370	92,200	740,500	14,740	6,460
149.2	**34.82**	**158,900**	**417,200**	**111.2**	**78.4**	**125,000**	**329,300**	**101.6**	**44.5**
	26.30	131,000	1,067,800	18,520	15,970	102,700	840,300	16,930	9,720
	39.14	**177,600**	**474,900**	**127.7**	**110.1**	**139,200**	**373,700**	**116.7**	**67.0**
6 5/8	25.20	141,200	978,900	13,070	6,250	111,500	774,900	11,950	3,420
168.3	**37.50**	**191,400**	**435,400**	**90.1**	**43.1**	**151,100**	**344,600**	**82.4**	**23.6**
	27.70	152,600	1,068,400	14,340	7,970	120,300	844,800	13,110	4,590
	41.22	**206,800**	**475,200**	**98.9**	**55.0**	**163,100**	**375,700**	**90.4**	**31.6**

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SMALL DIAMETER WORK STRING DATA
(MT-DS1 TOOL JOINTS - N-80 TUBE MATERIAL)

TUBING DATA							TOOL JOINT DATA						
	O.D.	WALL THICKNESS	I.D.	ASSEMBLY WEIGHT LBS/FT	TENSILE YIELD LBS	TORSIONAL YIELD FT-LBS	O.D.	I.D.	FLUID FLOW IN^2	AREA OF PIN 5/8 FROM SHOULDER	TENSILE YIELD LBS	TORSIONAL YIELD FT-LBS	MAKE-UP TORQUE FT-LBS
1" MT-DSI	1.315	0.133	1.049	1.75	39520	1019	1.562	0.812	0.518	0.418	50160	1137	340
	1.315	0.188	0.940	2.32	53120	1265	1.562	0.750	0.442	0.495	59400	1222	400
	1.315	0.219	0.877	2.61	60320	1377	1.562	0.750	0.442	0.495	59400	1222	400
1-1/4" MT-DSI	1.660	0.140	1.380	2.37	53600	1803	1.750	1.000	0.785	0.501	60120	1241	450
	1.660	0.198	1.264	3.17	72800	2288	1.750	0.875	0.601	0.685	82200	1471	610
	1.660	0.228	1.204	3.56	82080	2496	1.750	0.812	0.518	0.768	92160	1571	690
	1.660	0.280	1.100	4.19	97200	2784	1.750	0.750	0.442	0.845	101400	1661	690
1-1/2" MT-DSI	1.900	0.145	1.610	2.84	63920	2504	2.000	1.156	1.050	0.668	83640	2012	670
	1.900	0.188	1.524	3.55	80880	3031	2.000	1.125	0.994	0.724	90360	2091	725
	1.900	0.219	1.462	4.03	92160	3358	2.000	1.063	0.886	0.831	103200	2242	835
	1.900	0.280	1.340	4.93	114000	3889	2.000	1.000	0.785	0.932	115440	2380	935
2-1/16" MT-DSI	2.062	.156	1.750	3.27	74728	3186	2.330	1.250	1.227	1.025	123000	3734	1100

NOTES:
1. All dimensions in inches unless otherwise specified
2. Tool joint strength values based on minimum yield strength of 120,000 psi / Tubing strength values are based on N-80 Material (80,0000 Yield)i

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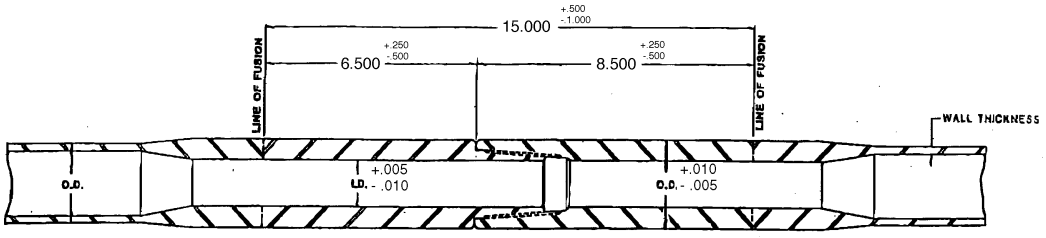
SMALL DIAMETER WORK STRING DATA
(MT TOOL JOINTS - N-80 TUBE MATERIAL)



	TUBING DATA						TOOL JOINT DATA						
	O.D.	WALL THICKNESS	I.D.	ASSEMBLY WEIGHT LBS/FT	TENSILE YIELD LBS	TORSIONAL YIELD FT-LBS	O.D.	I.D.	FLUID FLOW IN^2	AREA OF PIN 1/2" FROM SHOULDER	TENSILE YIELD LBS	TORSIONAL YIELD FT-LBS	MAKE-UP TORQUE FT-LBS
1" MT	1.315	0.133	1.049	1.75	39520	1019	1.562	0.812	0.518	0.440	52800	636	450
	1.315	0.188	.940	2.32	53120	1265	1.562	0.750	0.442	0.516	61920	727	500
	1.315	0.219	.877	2.61	60320	1377	1.562	0.750	0.442	0.516	61920	727	500
1-1/4" MT	1.660	0.140	1.380	2.37	53600	1803	1.750	1.000	0.785	0.528	63360	818	500
	1.660	0.198	1.264	3.17	72800	2288	1.750	0.875	0.601	0.712	85440	1090	650
	1.660	0.228	1.204	3.56	82080	2496	1.750	0.812	0.518	0.794	95280	1136	650
	1.660	0.280	1.100	4.19	97200	2784	1.750	0.750	0.442	0.871	104520	1136	650
1-1/2" MT	1.900	0.145	1.610	2.84	63920	2504	2.000	1.156	1.050	0.698	83760	1182	700
	1.900	0.188	1.524	3.55	80880	3031	2.000	1.125	0.994	0.754	90480	1272	750
	1.900	0.219	1.462	4.03	92160	3358	2.000	1.063	0.886	0.862	103440	1454	850
	1.900	0.280	1.340	4.93	114000	3889	2.000	1.000	0.785	0.963	115560	1636	900
2-1/16" MT	2.062	.156	1.750	3.27	74728	3186	2.330	1.250	1.227	1.025	123000	1840	1100

NOTES:
1. All dimensions in inches unless otherwise specified
2. Tool joint strength values based on minimum yield strength of 120,000 psi / Tubing strength values are based on N-80 Material (80,0000 Yield)i

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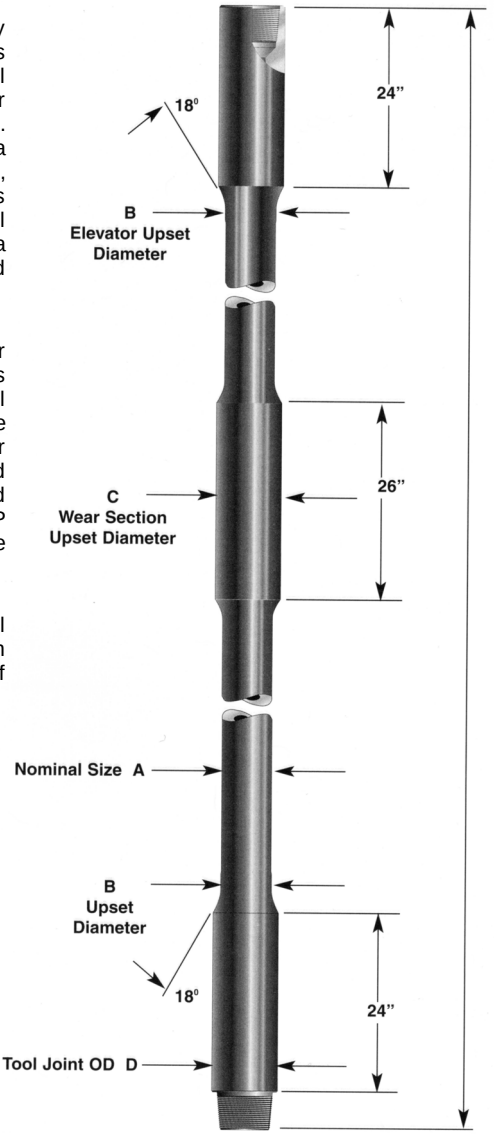
HEAVY WEIGHT DRILL PIPE (HWDP)

Thick Walled pipe called Heavy Weight Drill Pipe (HWDP) was developed to provide gradual transition from the heavy drill collar to the relatively light weight drill pipe. This intermediate-weight pipe has a wall thickness of approximately 1", and helps to prevent stress concentration at the top of the drill collar. It, also, allows you to drill at a higher rpm, reducing toque and differential pressure sticking.

HWDP is intended primarily for directional drilling. Because it bends easily, it simplifies directional control and minimizes connection fatigue problems common to high-angle or horizontal drilling. The reduced number of pipe failures and increased drill-stem service, also, make HWDP appropriate for some straight-hole applications.

Various Combinations of HWDP, drill collars, and standard drill string can be created to meet the challenge of severe drilling conditions.



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HEAVY WEIGHT DRILL PIPE DIMENSIONAL / MECHANICAL PROPERTIES

Nom. Size "A"	HW* Type	Weight w/Tool Joints	Tube I.D.	Center Upset "C"	Upset Diam. "B"	Tube Tensile Yield	Tube Torsion Yield	Connection Type	Tool Joint O.D. "D"	Tool Joint I.D.	T.J. Tensile Yield	T.J. Torsion Yield	Max. Make Up Torque	Cap. With T.J.	Disp. With T.J.
in **mm**		lb/ft **kg/m**	in **mm**	in **mm**	in **mm**	lb **daN**	ft.lb **N.m**		in **mm**	in **mm**	lb **daN**	ft.lb **N.m**	ft.lb **N.m**	gal/ft. **L/m**	gal/ft. **L/m**
2 7/8	**W**	12.50	2 1/8	3 3/8	N/A	161,900	8,600	2 7/8 SL H-90	3 3/4	2 1/8	346,300	9,900	5,080	0.187	0.195
73.03		**18.60**	**53.98**	**85.73**	N/A	**72,000**	**11,600**		**95.25**	**53.98**	**154,000**	**13,400**	**6,800**	**2.32**	**2.42**
3 1/16	**I**	17.00	2	3 7/8	N/A	464,700	24,400	2 7/8 SL H-90	3 7/8	2	406,900	12,000	6,100	0.163	0.262
77.79		**25.30**	**50.80**	**98.43**	N/A	**206,700**	**33,000**		**98.43**	**50.80**	**180,900**	**16,200**	**8,200**	**2.02**	**3.25**
3 1/2	**I**	23.46	2 1/16	4	3 5/8	691,000	39,200	3 1/2 SH	4 1/8	2 1/16	432,500	11,500	6,200	0.173	0.359
88.90		**34.91**	**52.39**	**101.60**	**92.08**	**307,300**	**53,100**	2 7/8 API IF, NC26	**104.78**	**52.39**	**192,300**	**15,500**	**8,400**	**2.15**	**4.46**
	W	23.70	2 1/4	4	3 7/8	310,400	18,400	3 1/2 IF	4 3/4	2 1/4	724,900	17,500	9,900	0.207	0.355
		35.27	**57.15**	**101.60**	**98.43**	**138,000**	**24,900**		**120.65**	**57.15**	**322,400**	**23,700**	**13,400**	**2.57**	**4.41**
	W	23.96	2 1/4	4	3 5/8	310,500	18,500	3 1/2 IF	4 7/8	2 5/16	700,400	21,000	11,600	0.208	0.366
		35.66	**57.15**	**101.60**	**92.08**	**138,100**	**25,000**	NC38	**123.83**	**58.74**	**311,500**	**28,400**	**15,700**	**2.58**	**4.55**
	W	23.96	2 1/4	4	3 5/8	310,500	18,500	3 1/2 HT38	4 7/8	2 5/16	700,400	30,700	18,400	0.208	0.366
		35.66	**57.15**	**101.60**	**92.08**	**138,100**	**25,000**		**123.83**	**58.74**	**311,500**	**41,600**	**24,900**	**2.58**	**4.55**
	W	25.65	2 1/16	4	3 7/8	345,500	19,600	3 1/2 API IF	4 3/4	2 3/16	749,000	17,600	10,500	0.176	0.392
		38.17	**52.39**	**101.60**	**98.43**	**153,600**	**26,500**	NC38	**120.65**	**55.56**	**333,100**	**23,800**	**14,200**	**2.19**	**4.87**
4	**I**	27.93	2 9/16	4 1/2	4 1/8	815,200	55,300	4 SH	4 3/4	2 9/16	469,400	14,000	7,400	0.268	0.427
101.60		**41.56**	**65.09**	**114.30**	**104.78**	**362,600**	**74,900**	3 1/2 XH	**120.65**	**65.09**	**208,700**	**18,900**	**10,000**	**3.328**	**5.303**
	W	28.40	2 9/16	4 1/2	4 1/8	407,600	27,600	HT38	4 7/8	2 9/16	591,100	27,000	16,200	0.268	0.434
		42.26	**65.09**	**114.30**	**104.78**	**181,300**	**37,400**		**123.83**	**65.09**	**262,900**	**36,600**	**21,900**	**3.33**	**5.39**
	W	29.90	2 9/16	4 1/2	N/A	407,500	27,600	4 FH	5 1/4	2 9/16	768,400	25,300	14,400	0.268	0.457
		44.50	**65.09**	**114.30**	N/A	**181,200**	**37,400**	NC40	**133.35**	**65.09**	**341,800**	**34,300**	**19,500**	**3.33**	**5.68**
	W	29.92	2 9/16	4 1/2	4 1/8	407,600	27,600	4 FH	5 1/4	2 5/8	740,400	24,500	12,900	0.270	0.458
		44.53	**65.09**	**114.30**	**104.78**	**181,300**	**37,400**	NC40	**133.35**	**66.68**	**329,300**	**33,200**	**17,400**	**3.35**	**5.69**
	I	31.94	2 1/4	4 1/2	4 1/8	944,900	59,800	4 SH	4 3/4	2 1/4	599,300	18,000	9,500	0.207	0.489
		47.53	**57.15**	**114.30**	**104.78**	**420,300**	**81,000**	3 1/2 XH	**120.65**	**57.15**	**266,500**	**24,400**	**12,800**	**2.571**	**6.073**

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HEAVY WEIGHT DRILL PIPE DIMENSIONAL / MECHANICAL PROPERTIES

Nom. Size "A"	HW* Type	Weight w/Tool Joints	Tube I.D.	Center Upset "C"	Upset Diam. "B"	Tube Tensile Yield	Tube Torsion Yield	Connection Type	Tool Joint O.D. "D"	Tool Joint I.D.	T.J. Tensile Yield	T.J. Torsion Yield	Max. Make Up Torque	Cap. With T.J.	Disp. With T.J.
in mm		lb/ft kg/m	in mm	in mm	in mm	lb daN	ft.lb N.m		in mm	in mm	lb daN	ft.lb N.m	ft.lb N.m	gal/ft. L/m	gal/ft. L/m
4 1/2	W	41.45	2 3/4	5	4 5/8	548,100	40,700	4 1/2 XH	6 1/4	2 7/8	1,024,500	38,800	20,000	0.313	0.635
114.30		**61.68**	**69.85**	**127.00**	**117.48**	**243,800**	**55,100**	4 API IF, NC46	**158.75**	**73.03**	**455,700**	**52,600**	**27,100**	**3.887**	**7.886**
5	W	50.38	3	5 1/2	5 1/8	691,200	56,500	5 XH	6 5/8	3 1/16	1,265,500	51,600	26,800	0.369	0.771
127.00		**74.97**	**76.20**	**139.70**	**130.18**	**307,400**	**76,600**	4 1/2 API IF, NC50	**168.28**	**77.79**	**562,900**	**69,900**	**36,300**	**4.58**	**9.58**
5 1/2	I	46.70	4	6	5 5/8	1,119,200	113,100	5 1/2 API FH	7 1/4	4	1,054,800	47,000	24,300	0.653	0.717
139.70		**69.50**	**101.60**	**152.40**	**142.88**	**497,800**	**153,300**		**184.15**	**101.60**	**469,100**	**63,700**	**32,900**	**8.11**	**8.90**
	W	46.70	4	6	5 5/8	615,500	62,200	5 1/2 API FH	7 1/4	4	1,054,800	47,000	24,300	0.653	0.717
		69.50	**101.60**	**152.40**	**142.88**	**273,700**	**84,300**		**184.15**	**101.60**	**469,100**	**63,700**	**32,900**	**8.11**	**8.90**
	I	55.62	3 1/2	6	5 5/8	1,413,700	131,300	5 1/2 API FH	7	3 1/2	1,349,400	52,400	31,200	0.500	0.851
		82.77	**88.90**	**152.40**	**142.88**	**628,800**	**178,000**		**177.80**	**88.90**	**600,200**	**71,000**	**42,300**	**6.21**	**10.57**
	W	62.41	3 1/4	6	5 5/8	850,400	75,900	5 1/2 HT55-375	7 3/8	4	1,054,800	65,000	39,000	0.463	0.955
		92.88	**82.55**	**152.40**	**142.88**	**378,200**	**102,900**		**187.33**	**101.60**	**469,100**	**88,100**	**52,800**	**5.75**	**11.86**
	W	61.63	3 1/4	6	5 5/8	850,400	75,900	5 1/2 API FH	7 1/4	3 5/16	1,499,700	65,000	33,600	0.433	0.943
		91.72	**82.55**	**152.40**	**142.88**	**378,200**	**102,900**		**184.15**	**84.14**	**667,000**	**88,100**	**45,500**	**5.378**	**11.711**
5 7/8	W	57.42	4	6 3/8	6	799,800	82,700	5 7/8 XT57	7	4	1,169,300	88,500	53,100	0.653	0.878
149.23		**85.45**	**101.60**	**161.93**	**152.40**	**355,700**	**112,100**		**177.80**	**101.60**	**520,100**	**119,900**	**71,900**	**8.11**	**10.90**
6 5/8	I	62.31	5	7 1/4	6 3/4	1,483,700	185,500	6 5/8 API FH	8 1/2	5	1,207,000	62,400	32,000	1.020	0.953
168.28		**92.73**	**127.00**	**184.15**	**171.45**	**659,900**	**251,500**		**215.90**	**127.00**	**536,900**	**84,600**	**43,300**	**12.67**	**11.84**
	W	71.43	4 1/2	7 1/4	6 15/16	1,021,600	118,900	6 5/8 API FH	8	4 1/2	1,580,100	73,200	42,100	0.826	1.093
		106.30	**114.30**	**184.15**	**176.21**	**454,400**	**161,200**		**203.20**	**114.30**	**702,800**	**99,200**	**57,000**	**10.26**	**13.57**
	I	75.02	4 1/2	7 1/4	6 3/4	1,857,400	216,100	6 5/8 API FH	8 1/2	4 1/2	1,580,100	82,000	42,100	0.826	1.148
		111.64	**114.30**	**184.15**	**171.45**	**826,200**	**292,900**		**215.90**	**114.30**	**702,800**	**111,100**	**57,000**	**10.26**	**14.26**

Notes:

(1) * Heavy Weight Drill Pipe Type : W = Welded Tool Joints, I = Integral Tool Joints.
For Welded Tool Joints (W): Tube Tensile Yield is 55,000 psi
For Integral Tool Joints (I) : Tube Tensile Yield is 110,000 psi for pipe less than 5 1/2 O.D. and 100,000 psi for 5 1/2 an larger pipe O.D.

(2) Drift diameter = I.D. minus .125 inches

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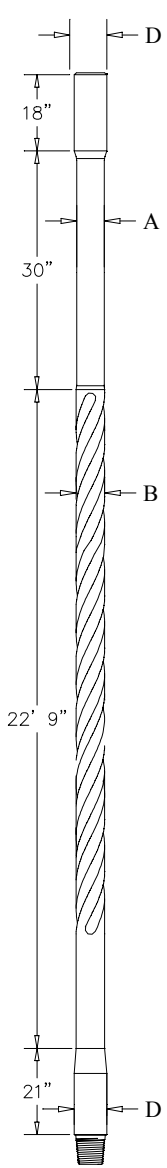
GRANT PRIDECO SPIRAL-WATE™ HWDP

Spiral-Wate Heavy Weight Drill Pipe offers strength, flexibility, weight and unique spiral design to improve drilling efficiency.

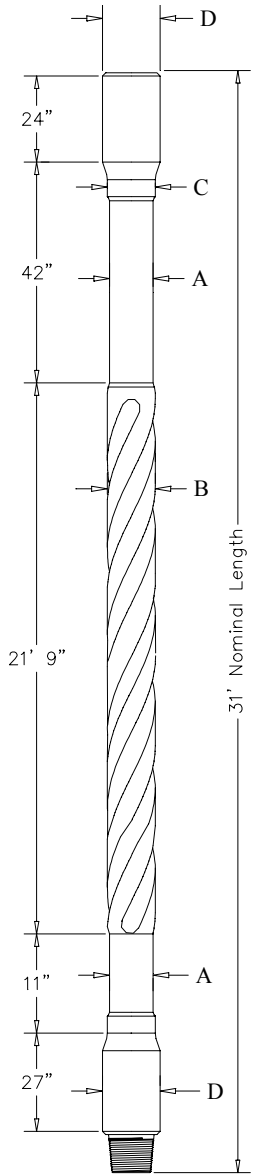
The full length deep spiral grooves keep drilling mud flowing continuously between the pipe and the well bore, regardless of down hole deviation .This reduces the chances of differential sticking while minimizing tube wear.

The full length deep grooved spiral design means your entire intermediate drill string will bend more uniformly with only half the conventional "wear pad" type heavy weight drill pipe, thus eliminating two critical stress areas.

The Spiral-Wate unique design has eliminated the center wear pad that causes casing wear problems.



2 9/16", 3 3/16" SPIRAL-WATE



3 1/2" - 6 5/8" SPIRAL-WATE

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GRANT PRIDECO SPIRAL-WATE HWDP PIPE DIMENSIONAL / MECHANICAL PROPERTIES

Nom. Size "A"	Weight w/Tool Joints	Tube I.D.	Spiral O.D. "B"	Upset O.D. "C"	Tube Tensile Yield	Tube Torsion Yield	Connection Type	Tool Joint O.D. "D"	Tool Joint I.D.	T.J. Tensile Yield	T.J. Torsion Yield	Make Up Torque	Cap. With T.J.	Disp. With T.J.
in **mm**	lb/ft **kg/m**	in **mm**	in **mm**	in **mm**	lb **daN**	ft.lb **N.m**		in **mm**	in **mm**	lb **daN**	ft.lb **N.m**	ft.lb **N.m**	gal/ft. **L/m**	gal/ft. **L/m**
2 9/16 **65.09**	10.5 **15.6**	1.975 **50.17**	2 7/8 **73.03**	N/A	230,300 **102,400**	11,300 **15,300**	2 3/8 SL H-90	3 1/8 **79.38**	1.975 **50.17**	218,500 **97,100**	4,900 **6,600**	2,500 **3,300**	0.159 **1.97**	0.160 **1.99**
	10.5 **15.6**	1.975 **50.17**	2 7/8 **73.03**	N/A	230,300 **102,400**	11,300 **15,300**	2 3/8 SL H-90 High Torque	3 1/8 **79.38**	1.975 **50.17**	202,700 **90,100**	6,800 **9,200**	3,900 **5,200**	0.159 **1.97**	0.160 **1.99**
3 3/16 **80.96**	15.1 **22.5**	2 1/8 **53.98**	3 5/16 **84.14**	N/A	487,700 **216,900**	27,000 **36,600**	2 7/8 SL H-90	3 3/4 **95.25**	2 1/8 **53.98**	398,600 **177,300**	10,600 **14,300**	5,400 **7,300**	0.184 **2.29**	0.231 **2.87**
3 1/2 **88.90**	30.4 **45.2**	2 1/4 **57.15**	4 **101.60**	3 5/8 **92.08**	310,500 **138,100**	18,500 **25,000**	3 1/2 IF (NC 38)	4 7/8 **123.83**	2 1/4 **57.15**	725,000 **322,400**	21,000 **28,400**	12,000 **16,200**	0.207 **2.57**	0.465 **5.77**
	30.4 **45.2**	2 1/4 **57.15**	4 **101.60**	3 5/8 **92.08**	310,500 **138,100**	18,500 **25,000**	3 1/2 IF (NC 38)	4 3/4 **120.65**	2 1/4 **57.15**	724,900 **322,400**	17,500 **23,700**	9,900 **13,400**	0.207 **2.57**	0.465 **5.77**
	27.2 **40.5**	2 1/2 **63.50**	4 **101.60**	3 5/8 **92.08**	518,400 **230,500**	32,900 **44,600**	3 1/2 HT 38	4 7/8 **123.83**	2 1/2 **63.50**	622,400 **276,800**	28,600 **38,700**	17,100 **23,100**	0.255 **3.17**	0.416 **5.17**
4 **101.60**	29.9 **44.5**	2 9/16 **65.09**	4 1/2 **114.30**	4 1/8 **104.78**	407,600 **181,300**	27,600 **37,400**	4 FH (NC40)	5 1/4 **133.35**	2 11/16 **68.26**	711,700 **316,500**	23,500 **31,800**	12,400 **16,800**	0.271 **3.366**	0.458 **5.688**
	32.9 **49.0**	2 1/4 **57.15**	4 1/2 **114.30**	4 1/8 **104.78**	944,900 **420,300**	59,800 **81,000**	4 SH (3 1/2 XH)	4 3/4 **120.65**	2 1/4 **57.15**	599,300 **266,500**	18,000 **24,400**	9,500 **12,800**	0.207 **2.57**	0.489 **6.07**
	28.4 **42.3**	2 9/16 **65.09**	4 1/2 **114.30**	4 1/8 **104.78**	407,600 **181,300**	27,600 **37,400**	4 SH (3 1/2 HT 38)	4 7/8 **123.83**	2 9/16 **65.09**	595,100 **264,700**	27,000 **36,600**	16,200 **21,900**	0.268 **3.328**	0.434 **5.390**
4 1/2 **114.30**	49.5 **73.7**	2 3/4 **69.85**	5 **127.00**	4 5/8 **117.48**	548,100 **243,800**	40,700 **55,100**	4 1/2 XH (NC46)	6 1/4 **158.75**	2 3/4 **69.85**	1,085,200 **482,700**	41,100 **55,700**	21,300 **28,800**	0.31 **3.838**	0.76 **9.414**
	49.5 **73.7**	2 3/4 **69.85**	5 **127.00**	4 5/8 **117.48**	548,100 **243,800**	40,700 **55,100**	4 1/2 XH (NC46)	6 1/4 **158.75**	2 7/8 **73.03**	1,024,500 **455,700**	38,200 **51,700**	21,700 **29,400**	0.31 **3.838**	0.76 **9.414**

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GRANT PRIDECO SPIRAL-WATE HWDP PIPE DIMENSIONAL / MECHANICAL PROPERTIES

Nom. Size "A"	Weight w/Tool Joints	Tube I.D.	Spiral O.D. "B"	Upset O.D. "C"	Tube Tensile Yield	Tube Torsion Yield	Connection Type	Tool Joint O.D. "D"	Tool Joint I.D.	T.J. Tensile Yield	T.J. Torsion Yield	Make Up Torque	Cap. With T.J.	Disp. With T.J.
in **mm**	lb/ft **kg/m**	in **mm**	in **mm**	in **mm**	lb **daN**	ft.lb **N.m**		in **mm**	in **mm**	lb **daN**	ft.lb **N.m**	ft.lb **N.m**	gal/ft. **L/m**	gal/ft. **L/m**
5 **127.00**	59.2 **88.1**	3 **76.20**	5 1/2 **139.70**	5 1/8 **130.18**	691,200 **307,400**	56,500 **76,600**	4 1/2 IF (NC50)	6 5/8 **168.28**	3 **76.20**	1,298,200 **577,400**	53,000 **71,800**	27,500 **37,200**	0.367 **4.56**	0.905 **11.24**
5 1/2 **139.70**	56.7 **84.4**	4 **101.60**	6 **152.40**	5 5/8 **142.88**	615,600 **273,800**	49,800 **67,500**	5 1/2 FH	7 1/4 **184.15**	4 **101.60**	1,054,800 **469,100**	47,000 **63,700**	24,300 **32,900**	0.653 **8.11**	0.868 **10.78**
	65.2 **97.0**	3 1/2 **88.90**	6 **152.40**	5 5/8 **142.88**	1,413,700 **628,800**	131,300 **178,000**	5 1/2 FH	7 **177.80**	3 1/2 **88.90**	1,349,400 **600,200**	52,400 **71,000**	31,200 **42,300**	0.500 **6.21**	0.998 **12.39**
	55.2 **82.1**	4 **101.60**	6 **152.40**	5 5/8 **142.88**	615,600 **273,800**	62,200 **84,300**	5 1/2 FH DS55 5 1/2 FH DSTJ	7 **177.80**	3 1/2 **88.90**	1,349,400 **600,200**	74,300 **100,700**	44,600 **60,400**	0.631 **7.837**	0.845 **10.494**
	55.2 **82.1**	4 **101.60**	6 **152.40**	5 5/8 **142.88**	615,200 **273,600**	62,200 **84,300**	5 1/2 HT 55-375	7 **177.80**	4 **101.60**	1,054,800 **469,100**	64,400 **87,300**	38,600 **52,300**	0.653 **8.11**	0.845 **10.49**
	57.5 **85.6**	4 **101.60**	6 **152.40**	5 5/8 **142.88**	615,600 **273,800**	62,200 **84,300**	5 1/2 HT 55-375	7 3/8 **187.33**	4 **101.60**	1,054,800 **469,100**	65,000 **88,100**	39,000 **52,800**	0.653 **8.11**	0.879 **10.92**
5 7/8 **149.23**	65.4 **97.3**	4 **101.60**	6 3/8 **161.93**	6 **152.40**	639,800 **284,500**	82,700 **112,100**	5 7/8 XT57	7 **177.80**	4 **101.60**	1,169,300 **520,100**	88,500 **119,900**	53,100 **71,900**	0.653 **8.11**	1.000 **12.42**
6 5/8 **168.28**	86.1 **128.1**	4 1/2 **114.30**	7 1/8 **180.98**	6 3/4 **171.45**	1,857,400 **826,200**	216,100 **292,900**	6 5/8 FH	8 **203.20**	4 1/2 **114.30**	1,580,100 **702,800**	73,100 **99,100**	42,100 **57,000**	0.826 **10.26**	1.317 **16.36**
	73.4 **109.2**	5 **127.00**	7 1/8 **180.98**	6 3/4 **171.45**	1,483,700 **659,900**	185,500 **251,500**	6 5/8 FH	8 **203.20**	5 **127.00**	1,207,000 **536,900**	61,400 **83,200**	32,000 **43,300**	1.020 **12.67**	1.123 **13.95**

Note: Drift diameter = I.D. minus .125 inches.

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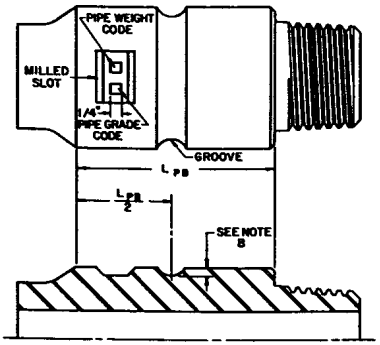
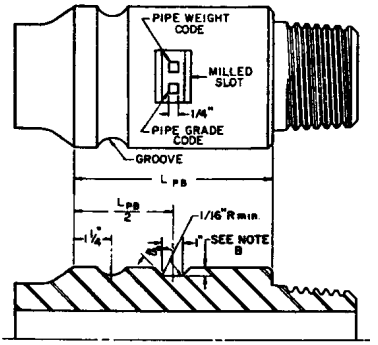
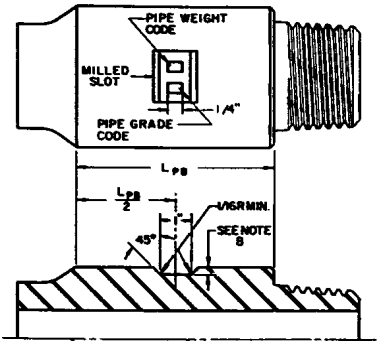
RECOMMENDED PRACTICE FOR MILL SLOT AND GROOVE METHOD OF DRILL STRING IDENTIFICATION



STANDARD WEIGHT HIGH STRENGTH DRILL PIPE



HEAVY WEIGHT HIGH STRENGTH DRILL PIPE



HEAVY WEIGHT GRADE E DRILL PIPE

DRILL PIPE GRADE CODE

STANDARD GRADES		HIGH STRENGTH GRADES	
Grade	**Symbol**	**Grade**	**Symbol**
N-80	N	X-95	X
E	E	G-105	G
C-75	C	S-135	S
		V-150	V

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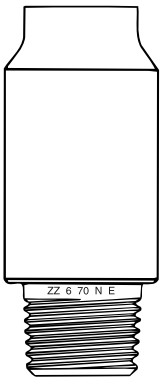
RECOMMENDED PRACTICE FOR MILL SLOT AND GROOVE METHOD OF DRILL STRING IDENTIFICATION

SAMPLE MARKINGS AT BASE OF PIN

1	2	3	4	5
ZZ	6	70	N	E



1 - Tool Joint Manufacturer's Symbol
ZZ Company
(Fictional for example only)

2 - Month Welded
6 - June

3 - Year Welded
70 - 1970

4 - Pipe Manufacturer's Symbol
N - United States Steel Company

5 - Drill Pipe Grade
E - Grade E75 Drill Pipe

Tool Joint Manufacturer's Symbol, Month welded, Year welded. Pipe Manufacturer and Drill Pipe Grade Symbol shall be stencilled at the base of pin as shown above. Pipe Manufacturer symbol and Drill Pipe Grade symbol applied shall be as represented by Manufacturer, Supplier, Owner or User documents such as mill certification papers or purchase orders.

TOOL JOINT MANUFACTURER'S SYMBOL

Refer to the eleventh edition 1993 of the IADC Drilling Manual* (Section B-1-9) for list of Tool Joint Manufacturer's symbols. *Available from: International Association of Drilling Contractors (IADC) P.O. Box 4287, Houston, TX 77210

MONTH AND YEAR WELDED

Month	Year
1 through 12	Last two digits of year

DRILL PIPE GRADE

Grade	Symbol
E75	E
X95	X
G105	G
S135	S

HEAVY WEIGHT DRILL PIPE
(Double Stencil Pipe Grade Symbol)

PIPE MANUFACTURERS
(PIPE MILLS OR PROCESSORS)

ACTIVE		INACTIVE	
Mill	Symbol	Mill	Symbol
Algoma	X	Armco	A
British Steel Seamless Tubes Ltd Seamless	AI	B	American
Dalmine	D	B & W	W
Kawasaki	H	CF & I	C
Nippon	I	J & L	J
NKK	K	Lone Star	L
Mannesmann	M	Ohio	O
Reynolds Aluminum	RA	Republic	R
Sumitomo	S	TI	Z
Siderca	SD	Tubemuse	TU
Tamsa	T	Voest	VA
US Steel P	N	Wheeling Pittsburgh	
Vallourec	V	Youngstown	Y
Used	U		
Processor	Symbol		
Grant TFW	TFW		
Omsco	OMS		
Prideco	PI		

The "Manufacturer" may be either a pipe mill or processor. See API Spec 5D, Specification for Drill Pipe.

These symbols are provided for pipe manufacturer identification and have been assigned at pipe manufacturer's requests.

Manufacturers included in this list may not be current API Spec 5D licensed pipe manufacturers. A list of current licensed pipe manufacturers is available in the *Composite List of Manufacturers, (Licensed for Use of the API Monogram.)*

Pipe mills may upset and heat treat their own drill pipe, or they may have this done according to their own specifications. In either case, the mill's assigned symbol should be used on each drill string assembly since they are the pipe manufacturer.

Pipe processors may buy "green" tubes and upset and heat treat these according to their own specifications. In this case, the processor's assigned symbol should be used on each drill string assembly since they are the pipe manufacturer.

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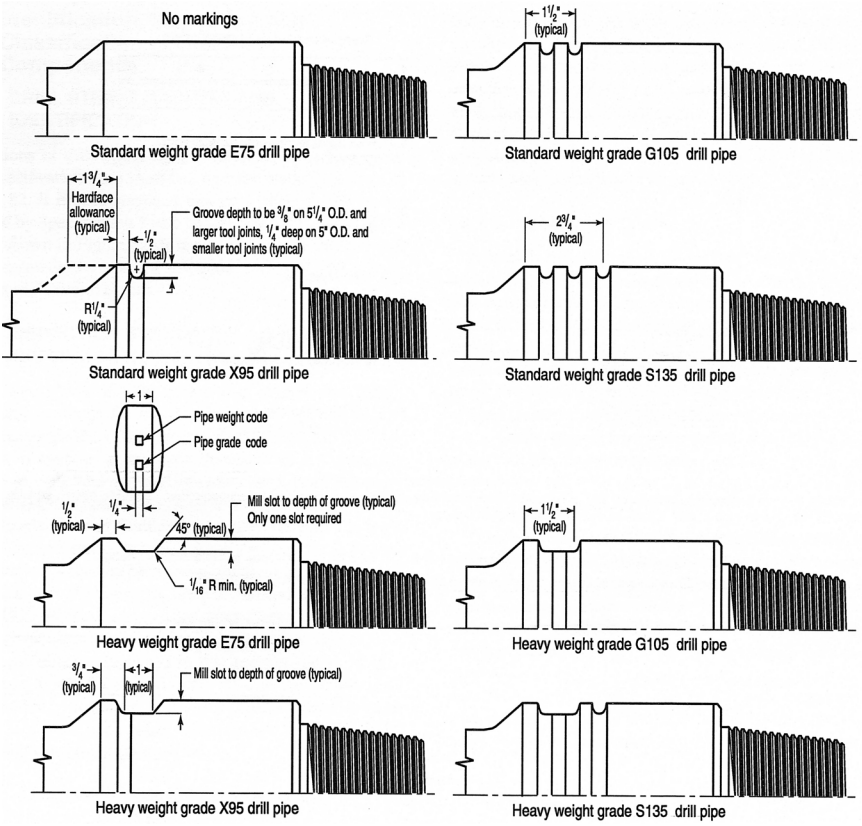
RECOMMENDED PRACTICE FOR MILL SLOT AND GROOVE METHOD OF DRILL STRING IDENTIFICATION


No markings
Standard weight grade E75 drill pipe
1 1/2" (typical)
Standard weight grade G105 drill pipe
1 3/4"
Hardface allowance (typical)
1/2" (typical)
Groove depth to be 3/8" on 5 1/4" O.D. and larger tool joints, 1/4" deep on 5" O.D. and smaller tool joints (typical)
R1/4" (typical)
Standard weight grade X95 drill pipe
2 3/4" (typical)
Standard weight grade S135 drill pipe
1
Pipe weight code
Pipe grade code
1/2" (typical)
1/4"
45° (typical)
Mill slot to depth of groove (typical) Only one slot required
1/16" R min. (typical)
Heavy weight grade E75 drill pipe
1 1/2" (typical)
Heavy weight grade G105 drill pipe
3/4" (typical)
1 (typical)
Mill slot to depth of groove (typical)
Heavy weight grade X95 drill pipe
Heavy weight grade S135 drill pipe

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RECOMMENDED PRACTICE FOR MILL SLOT AND GROOVE METHOD OF DRILL STRING IDENTIFICATION

NOTE A: Standard weight Grade E drill pipe designed by an asterisk (*) in the drill pipe weight code will have no groove or milled slot for identification. Grade E heavy weight drill pipe will have a milled slot only, in the center of the tong space.

NOTE B: Groove radius approximately 3/8 inch. Groove and milled slot to be 1/4 in. deep on 5-1/4 in. O.D. and larger tool joints, 3/16 in. deep on 5 in. O.D. and smaller tool joints.

NOTE C: Stencil the grade code symbol and weight code number corresponding to grade and weight of pipe in milled slot of pin. Stencil with 1/4 in. high characters so marking may be read with dril pipe hanging in elevators.

L_{PB} = Pin Tong Space Length (See Table 4.2, Spec 7 of the A.P.I. Drill Stem Design Eighth Edition, pg. 67).

DRILL PIPE WEIGHT CODE

1	2	3	4
Size (O.D.) inches	Nominal Wt. Lb. per ft.	Wall Thickness Inches	Weight Code Number
2-3/8	4.85	.190	1
	6.65*	.280	2
2-7/8	6.85	.217	1
	10.40*	.362	2
3-1/2	9.50	.254	1
	13.30*	.368	2
	15.50	.449	3
4	11.85	.262	1
	14.00*	.330	2
	15.70	.380	3
4-1/2	13.75	.271	1
	16.60*	.337	2
	20.00	.430	3
	22.82	.500	4
	24.66	.550	5
	25.50	.575	6
5	16.25	.296	1
	19.50*	.362	2
	25.60	.500	3
5-1/2	19.20	.304	1
	21.90*	.361	2
	24.70	.415	3
6-5/8	25.20*	.330	2
	27.70	.362	3

*Designates standard weight for drill pipe

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CLASSIFICATION OF USED DRILL PIPE

(All sizes, weights and grades. Nominal dimension is basis for all calculations.)

Pipe Condition	Premium Class[1] Two White Bands One Center Punch Mark	Class 2 Yellow Bands Two Center Punch Marks	Class 3 Orange Bands Three Punch Marks
EXTERIOR CONDITIONS[4]			
A. OD Wear Wall	Remaining wall not less than 80%	Remaining wall not less than 70%	Any imperfections or damages exceeding CLASS 2
B. Dents and mashes	Diameter reduction not over 3% of OD	Diameter reduction not over 4% of OD	
Crushing, necking	Diameter reduction not over 3% of OD	Diameter reduction not over 4% of OD	
C. Slip area Mechanical damage Cuts[2], gouges[2]	Depth not to exceed 10% of the average adjacent wall [5]	Depth not to exceed 20% of the average adjacent wall[5]	
D. Stress induced diameter variations			
1. Stretched	Diameter reduction not over 3% of OD	Diameter reduction not over 4% of OD	
2. String shot	Diameter increase not over 3% of OD	Diameter increase not over 4% of OD	
E. Corrosion, cuts, and gouges			
1. Corrosion	Remaining wall not less that 80%	Remaining wall not less than 70%	
2. Cuts and gouges			
Longitudinal	Remaining wall not less than 80%	Remaining wall not less than 70%	
Transverse	Remaining wall not less than 80%	Remaining wall not less than 80%	
F. Cracks[3]	None	None	None
INTERIOR CONDITIONS			
A. Corrosive pitting Wall	Remaining wall not less than 80% measured from base of deepest pit	Remaining wall not less than 70% measured from base of deepest pit	
B. Erosion and wear Wall	Remaining wall not less than 80%	Remaining wall not less than 70%	
C. Cracks[3]	None		None

[1]The premium classification is recommended for service where it is anticipated that torsional or tensile limits for Class 2 drill pipe and tubing Class shall be identified with two white bands, plus one center punch mark on the 35 degree or 18 degree shoulder of the pin end tool joint.

[2]Remaining wall shall not be less than the value in I.E.2, defects may be ground out providing the remaining wall is not reduced below the value shown in I.E.1 of this table and such grinding to be approximately faired into outer contour of the pipe.

[3]In any classification where cracks or washouts appear, the pipe will be identified with the red band and considered unfit for further drilling service.

[4]An API Recommended Practice 7G inspection cannot be made with drill pipe rubber on the pipe

[5]Average adjacent wall is determined by measuring the wall thickness on each side of the cut or gouge adjacent to the deepest penetration.

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DRILL PIPE AND TOOL JOINT COLOR CODE IDENTIFICATION

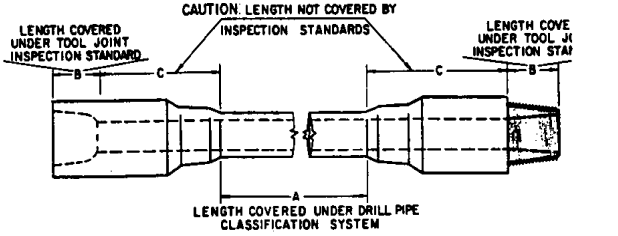
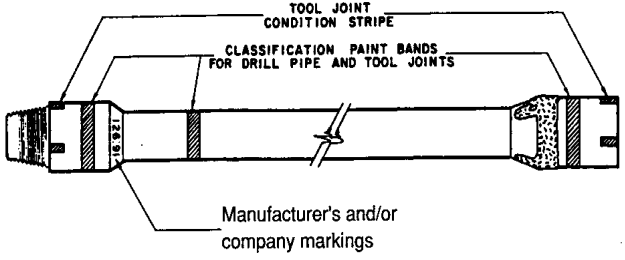

CAUTION: LENGTH NOT COVERED BY INSPECTION STANDARDS
LENGTH COVERED UNDER TOOL JOINT INSPECTION STANDARD
LENGTH COVE UNDER TOOL J INSPECTION STA
B
C
A
LENGTH COVERED UNDER DRILL PIPE CLASSIFICATION SYSTEM
CAUTION: LENGTH NOT COVERED BY INSPECTION STANDARDS
LENGTH COVERED UNDER TOOL JOINT INSPECTION STANDARD
LENGTH COVERED UNDER TOOL JOINT INSPECTION STANDARD
LENGTH COVERED UNDER DRILL PIPE CLASSIFICATION SYSTEM

FIG. 10.3
IDENTIFICATION OF LENGTHS COVERED BY INSPECTION STANDARDS


TOOL JOINT CONDITION STRIPE
CLASSIFICATION PAINT BANDS FOR DRILL PIPE AND TOOL JOINTS
Manufacturer's and/or company markings

Tool Joint And Drill Pipe Classification of	Number And Color of Bands
Class 1	One White
Premium Class	Two White
Class 2	One Yellow
Class 3	One Blue
Class 4	One Green
Scrap	One Red

Tool Joint Condition	Color Of Bands
Scrap Or Shop Repairable	Red
Field Repairable	Green

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SECTION 8

ELECTRICAL WIRELINE SERVICE

Page

Free Point Indicators, Tornado Jet Perforators, Tubing Deflection Shots & Bow Strings 1

Weatherford Homco™ Tubing & Drill Pipe Wireline Swivel 2

Sinker Bars, Downhole Shots, & D.C. Severing Tools 3

J. Ed Hill Junk Shots 4

Jet Cutters ..... 5 - 6

Pipe Recovery Systems: Chemical Cutter ..... 7 - 8

Cablesa Cable Specifications 9

Camesa Cable Size & Specifications ..... 10 - 25

Cable Stretch Charts ..... 26 - 32

Free Point for 1" & 1-1/4" Coiled Tubing ..... 33 - 36

Wireline Cement Bailers & Hydromite ..... 37 - 44

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FREE POINT INDICATORS			
Manufacture	Size	Pressure Rating	Temp Rating
Applied	11/16" OD	21,000 psi	475° F
Weatherford	3/4" OD	15,000 psi	380° F
Applied	1" OD	21,000 psi	475° F
Applied	1-3/8" OD	21,000 psi	475° F
Weatherford	1-3/8" OD	15,000 psi	400° F
Gearhart	1-7/16" OD	15,000 psi	345° F

TORNADO LINK JET PERFORATOR		
O.D.	1-11/16"	2-1/8"
Grams	11.00	22.00
Entry Hole	0.37"	0.45"
Penetration Depth (Steel)	2.95"	3.10"
Penetration Depth (Concrete)	6.55"	

TUBING DEFLECTION SHOTS

15/16" O.D.
1-1/4" O.D.
1-3/8" O.D.
1-11/16" O.D.
1-9/16"
2"

BOW SPRINGS

1-3/8" O.D. - Pipe Size Range 1-1/2 - 5" I.D.
2-3/8" O.D. - Pipe Size Range 5 - 13" I.D. for Casing

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WEATHERFORD HOMCO™ TUBING AND DRILL PIPE WIRELINE SWIVEL

The Weatherford Tubing and Drill Pipe Swivel is an essential tool for wireline equipment. During the running and use of wireline equipment, many operations require rotation of the fishing string. The elevator blocks should not rotate during these operations to prevent wrapping the wireline around the blocks. The Weatherford Swivel, when installed as an integral part of the fishing string, allows the string to be rotated and tension applied while the elevator blocks are locked in a non-rotating position. The Swivel can be used in conjuction with a safety valve, pump in sub, lubricator joint, wireline blowout preventer and wireline packoff to permit full circulation, rotation and pulling while maintaining complete well control.

Many downhole operations require this type flexibility and control including freepoint and backoff work, setting and releasing an overshot, milling over the top of a fish with overshot mill control, screwing the fishing string back into a fish, and circulaiton when running above work. The Swivel is normally run below the joint of drill pipe or pup joint being held by elevators. If a lubrication system is used, it is run between the safety valve and pump in sub or lubricator joint. Rotation of the fishing string can be done using the rotary table, power tongs, or manually. The Swivel is constructed of high strength alloy steel. It utilizes a heavy duty type thrust bearing for loading and rotation. "U" type packing is used for sealing between the washpipe and housing. The bearing and seals are lubricated to provide long life. A protected grease fitting is provided for proper maintenance procedures.

Complete Assembly No.	339-370	Cdn. Modified	Cdn Built	339-392	339-391	339-375	339-393
O.D. (in.)	6-1/8	6-1/8	7-5/8	9	9	10-1/4	11-1/4
I.D. (in.)	2-7/16	2.441	2.992	2-1/2	2-1/8	3	3-1/4
Connection (in.)	2-7/8 EUE	2-7/8 EUE	3-1/2 EUE	2-7/8 IF	3-1/2 IF	4-1/2 F.H.	4-1/2 IF
Bearing Load Static (lbs.)	55,000	55,470	158,000	400,000	400,000	440,000	440,000
Bearing Load (at 10 r.p.m.)	28,000	*	90,400	195,000	195,000	195,000	195,000
LENGTH (in.)	18-3/4	24	31	34	34	35	37
WEIGHT (lbs.)	60	65	147	226	235	318	382

* Not Computed At 10 r.p.m., At 500 r.p.m. Bearing Rated For 6,740 lbs.

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ELECTRICAL SINKER BARS
5/8" O.D.
3/4" O.D.
1" O.D.
1-3/8" O.D.
1-5/8" O.D.
1-11/16" O.D.

WIRELINE DOWNHOLE SHOT
Shot O.D.
15/16"
1-1/8"
1-3/8"
1-11/16"
1-13/16"
2-1/8"
3-1/2"
4-1/2"
6"

HALIBURTON DRILL COLLAR SEVERING TOOLS
Size O.D.
1-3/8" O.D.
1-3/4" O.D.
2" O.D.
2-5/8" O.D.

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J. ED HILL JUNK SHOTS	
O.D. Penetration Entrance Width	5-1/4" 14" 2-3/4" Tapers To "0"
Penetration Force Released In Foot Lbs.	1,320,000
Explosives Weight Per Shot	4#
Other sizes also available 3-1/4" O.D. 3-1/2" O.D. 4-1/4" O.D. 7-3/4" O.D.	

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JET CUTTERS

Tubing Jet Cutter Size	Running Tool Size	M.F.	Recommended Pipe Size
23/32" OD	5/8"	J	1" Coiled Tubing
61/64" OD	5/8"	J	1-1/4" Coiled Tubing
1-3/16" OD	5/8"	J	1-1/2" Coiled Tubing
1.23 OD	1"	G	1.66" Tubing
1.25 OD (SC)	1"	O	
1.39 OD	1"	G	1.9" Tubing
1.5 0D (SC)	1-1/2"	O	
1.56 OD	1-1/2"	G	2-1/16" Tubing
1.58 OD (SC)	1-1/2"	O	Heavy Wall 2-3/8" of Thru Restriction
1-11/16" OD	1-1/2"	G	2-3/8" Thru Restriction
1-11/16" OD (SC)	1-1/2"	O	Heavy Wall 2-3/8" Thru Restriction
1-13/16" OD	1-1/2"	G	2-3/8" Tubing
2" OD (SC)	1-1/2"	O	Heavy Wall 2-7/8" Tubing or Thru Restriction
2-1/16" OD (SC)	1-1/2"	O	2-7/8" Tubing Thru Restriction
2-1/16" OD	1-1/2"	G	2-7/8" Tubing Thru Restriction
2-1/8" OD	1-1/2"	G	2-7/8" Tubing Thru Restriction
2-1/8" OD	1-1/2"	O	2-7/8" Tubing Thru Restriction
2-1/4" OD	1-1/2"	G	2-7/8" Tubing
2-1/4" OD (SC)	1-1/2"	GX	2-7/8" Tubing - 3-1/2" Tubing or 3-1/2" Drill Pipe
2-1/4" OD (SC)	1-1/2"	O	3-1/2" - 12.9 Tubing
2-5/16" OD	1-1/2"	G	3-1/2" Drill Pipe
2-1/2" OD	1-1/2"	G	3-1/2" Drill Pipe
2-1/2" OD(SC)	1-1/2"	GX	3-1/2" Tubing or 3-1/2" Drill Pipe
2-1/2" OD (SC)	1-1/2"	O	3-1/2" Tubing or 3-1/2" Drill Pipe
2-5/8" OD	1-1/2"	G	3-1/2" Tubing Thru Restriction
2-5/8 OD (SC)	1-1/2"	GX	3-1/2" Tubing
2-3/4" OD	1-1/2"	G	3-1/2" Tubing
2-3/4" OD	1-1/2"	GX	3-1/2" Tubing
3" OD	1-1/2"	G	4" Drill Pipe
3-1/4" OD	1-1/2"	G	4" Casing
3-7/16"	1-1/2"	G	4-1/2" Drill Pipe
3-7/16"	1-1/2"	GX	4-1/2" Drill Pipe
3-7/16" Segment	1-1/2"	O	4-1/2" Drill Pipe
3-5/8" Segment	1-1/2"	O	5" X Hole Drill Pipe
3-5/8"	1-1/2"	G	4-1/2" Casing
3-5/8"	1-1/2"	GX	4-1/2" Casing
3-13/16"	1-1/2"	G	4-3/4" and 5" Casing
3-13/16"	1-1/2"	GX	4-3/4" and 5" Casing
3-13/16" Segment	1-1/2"	O	4-3/4" and 5" Casing
4"	1-1/2"	G	5" Casing
4" segment	1-1/2"	O	5" Casing

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JET CUTTERS

Tubing Jet Cutter Size	Running Tool Size	M.F.	Recommended Pipe Size
4-1/4"	1-1/2"	GX	5" Casing
4-1/4" Segment	1-1/2"	O	5" Casing
4-1/2"	1-1/2"	GX	5-1/2" Casing & 5-9/16" Drill Pipe
4-1/2" C-4	1-1/2"	O	5-1/2" Casing & 5-9/16" Drill Pipe
4-3/4"	1-1/2"	GX	5-1/2" Casing
4-3/4"	1-1/2"	G	5-1/2" Casing
5-3/8"	1-1/2"	G	6" Casing
5-3/8"	1-1/2"	GX	6" Casing
5-3/8" Segment	1-1/2"	O	6" Casing
5-1/2"	1-1/2"	G	6-5/8" and 7" Casing
5-1/2"	1-1/2"	GX	6-5/8" and 7" Casing
5-1/2" Segment	1-1/2"	O	6-5/8" and 7" Casing
5-1/2" C-4	1-1/2"	O	6-5/8" and 7" Casing
5-3/4"	1-1/2"	GX	6-5/8" Casing and Drill Pipe and 7" Casing
5-3/4"	1-1/2"	G	6-5/8" Casing and Drill Pipe and 7" Casing
5-3/4" Segment	1-1/2"	O	6-5/8" Casing and Drill Pipe and 7" Casing
6"	1-1/2"	G	7" Casing
6"	1-1/2"	GX	7" Casing
6-1/2"	1-1/2"	G	7-5/8" Casing
6-1/2" Segment	1-1/2"	O	7-5/8" Casing
7-1/4" C-4	1-1/2"	O	8-5/8" Casing and 9" Casing
7-1/2"	1-1/2"	G	8-5/8" and 9" Casing
7-3/4"	1-1/2"	G	8-5/8" and 9" Casing
8-1/4" C-4	1-1/2"	O	9-5/8" Casing
8-9/32"	1-1/2"	G	9-5/8" Casing
8-9/32" Segment	1-1/2"	O	9-5/8" Casing
8-7/16"	1-1/2"	G	9-5/8" and 10" Casing
8-7/16" Segment	1-1/2"	G	9-5/8" and 10" Casing
9-1/4" C-4	1-1/2"	O	10-3/4" Casing
9-5/8" Segment	1-1/2"	O	10-3/4" Casing
9-5/8"	1-1/2"	G	10-3/4" Casing
10-1/2" C-4	1-1/2"	O	
12" C-4	1-1/2"	O	

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PIPE RECOVERY SYSTEMS, INC.
SELECTION GUIDE FOR
COILED TUBING CHEMICAL CUTTER

Cutter Size	Cutter Max Opening of Wedges/Slips	Pipe to Cut Cut O.D.	Pipe to be Cut I.D.	Pipe Weight Specification
in. / mm	in. / mm	in. / mm	in. / mm	lb/ft / kg/m
11/16 in. / 17.46 mm	**0.92 in.** / 23.37 mm	**1.00 in.** / 25.40 mm	**0.78 0.810 in.** / 19.86 20.57 mm	**0.918 1.037 lb/ft** / 1.37 1.54 kg/m
3/4 in. / 19.05 mm	**1.05 in.** / 26.67 mm	**1.00 in.** / 25.40 mm	**0.826 0.866 in.** / 20.98 22.00 mm	**0.688 0.848 lb/ft** / 1.02 1.26 kg/m
13/16 in. / 20.64 mm	**1.09 in.** / 27.69 mm	**1-1/4 in.** / 31.75 mm	**0.938 1.076 in.** / 23.83 27.33 mm	**1.081 1.823 lb/ft** / 1.61 2.71 kg/m
7/8 in. / 22.23 mm	**1.11 in.** / 28.19 mm	**1-1/4 in.** / 31.75 mm	**1.032 1.076 in.** / 26.21 27.33 mm	**1.081 1.328 lb/ft** / 2.39 1.98 kg/m
15/16 in. / 23.81 mm	**1.15 in.** / 29.21 mm	**1-1/4 in.** / 31.75 mm	**1.100 1.116 in.** / 27.94 28.35 mm	**0.840 0.941 lb/ft** / 1.25 1.40 kg/m
1.00 in. / 25.40 mm	**1.33 in.** / 33.78 mm	**1-1/2 in.** / 38.10 mm	**1.188 1.282 in.** / 30.18 32.56 mm	**1.619 2.239 lb/ft** / 2.41 3.33 kg/m
1-1/16 in. / 26.99 mm	**1.35 in.** / 34.29 mm	**1-1/2 in.** / 38.10 mm	**1.188 1.282 in.** / 30.18 32.56 mm	**1.619 2.239 lb/ft** / 2.41 3.33 kg/m
1-1/8 in. / 28.58 mm	**1.42 in.** / 36.07 mm	**1-1/2 in.** / 38.10 mm	**1.282 1.334 in.** / 32.56 33.88 mm	**1.256 1.619 lb/ft** / 1.87 2.41 kg/m
1-1/4 in. / 31.75 mm	**1.61 in.** / 40.89 mm	**1-3/4 in.** / 44.45 mm	**1.400 1.532 in.** / 35.56 38.91 mm	**2.944 1.910 lb/ft** / 4.38 2.84 kg/m
1-3/8 in. / 34.93 mm	**1.80 in.** / 45.72 mm	**2.00 in.** / 50.80 mm	**1.594 1.688 in.** / 40.49 42.88 mm	**3.072 3.896 lb/ft** / 4.57 5.80 kg/m
1-1/2 in. / 38.10 mm	**2.04 in.** / 51.82 mm	**2.00 in.** / 50.80 mm	**1.732 1.782 in.** / 43.99 45.26 mm	**2.201 2.671 lb/ft** / 3.28 3.97 kg/m
1-11/16 in. / 42.86 mm	**2.20 in.** / 55.88 mm	**2-3/8 in.** / 60.33 mm	**1.969 2.025 in.** / 50.01 51.44 mm	**4.112 4.709 lb/ft** / 6.12 7.01 kg/m
1-7/8 in. / 47.63 mm	**2.55 in.** / 64.77 mm	**2-3/8 in.** / 60.33 mm	**2.063 2.157 in.** / 52.40 54.79 mm	**2.638 4.709 lb/ft** / 3.93 7.01 kg/m
2-1/8 in. / 53.98 mm	**2.60 in.** / 66.04 mm	**2-7/8 in.** / 73.03 mm	**2.47 2.563 in.** / 62.71 65.10 mm	**4.530 5.793 lb/ft** / 6.74 8.62 kg/m
2-5/8 in. / 66.68 mm	**3.35 in.** / 85.09 mm	**3-1/2 in.** / 88.90 mm	**3.094 3.150 in.** / 78.59 80.01 mm	**6.215 7.148 lb/ft** / 10.03 12.83 kg/m

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SELECTION GUIDE FOR DIRECT ACTION CHEMICAL CUTTER

Cutter Size	Cutter Max Opening	Pipe to Cut Cut O.D.	Pipe to be Cut I.D.	Pipe Weight Specification
1-3/8 in.	**1.80 in.**	**1.90 in.**	**1.500 1.650 in.**	**2.40 3.64 lb/ft**
34.93 mm	45.72 mm	48.26 mm	38.10 41.91 mm	3.57 5.42 kg/m
		2-1/16 in.	**1.670 1.751 in.**	**3.25 3.40 lb/ft**
1-1/2 in.	**2.04 in.**	52.39 mm	42.42 44.48 mm	4.84 5.06 kg/m
38.10 mm	51.82 mm	**2-3/8 in.**	**1.703 1.995 in.**	**4.70 7.70 lb/ft**
		60.33 mm	43.26 50.67 mm	6.99 11.46 kg/m
1-9/16 in.	**2.10 in.**	**2-3/8 in.**	**1.853 1.995 in.**	**4.70 6.20 lb/ft**
39.69 mm	53.34 mm	60.33 mm	47.07 50.67 mm	6.99 9.23 kg/m
1-11/16 in.	**2.20 in.**	**2-3/8 in.**	**1.939 1.995 in.**	**4.70 5.30 lb/ft**
42.86 mm	55.88 mm	60.33 mm	49.25 50.67 mm	6.99 7.89 kg/m
1-3/4 in.	**2.50 in.**	**2-7/8 in.**	**2.059 2.441 in.**	**6.50 10.70 lb/ft**
44.45 mm	63.50 mm	73.03 mm	52.30 62.00 mm	10.41 15.92 kg/m
1-7/8 in.	**2.55 in.**	**2-7/8 in.**	**2.059 2.441 in.**	**6.50 10.70 lb/ft**
47.63 mm	64.77 mm	73.03 mm	52.30 62.00 mm	9.67 15.92 kg/m
2.00 in.	**2.58 in.**	**2-7/8 in.**	**2.195 2.441 in.**	**6.50 9.50 lb/ft**
50.80 mm	65.53 mm	73.03 mm	55.753 62.00 mm	9.67 14.14 kg/m
2-1/8 in.	**2.60 in.**	**2-7/8 in.**	**2.323 2.441 in.**	**6.50 7.90 lb/ft**
53.98 mm	66.04 mm	73.03 mm	59.00 62.00 mm	9.67 11.76 kg/m
2-3/16 in.	**2.90 in.**	**3-1/2 in.**	**2.480 2.750 in.**	**12.95 16.70 lb/ft**
55.56 mm	73.66 mm	88.90 mm	62.99 69.85 mm	19.27 24.85 kg/m
2-1/4 in.	**3.15 in.**	**3-1/2 in.**	**2.602 2.922 in.**	**10.30 15.50 lb/ft**
57.15 mm	80.01 mm	88.90 mm	66.09 74.22 mm	15.33 23.06 kg/m
2-3/8 in.	**3.25 in.**	**3-1/2 in.**	**2.602 3.068 in.**	**7.70 15.50 lb/ft**
60.33 mm	82.55 mm	88.90 mm	66.09 77.93 mm	11.46 23.06 kg/m
2-5/8* in.	**3.35 in.**	**3-1/2 in.**	**2.922 3.068 in.**	**7.70 10.30 lb/ft**
66.68 mm	85.09 mm	88.90 mm	74.22 77.93 mm	11.46 15.33 kg/m
2-7/8* in.	**3.65 in.**	**4.00 in.**	**3.240 3.476 in.**	**11.00 15.70 lb/ft**
73.03 mm	92.71 mm	101.60 mm	82.30 88.29 mm	16.37 23.36 kg/m
3-1/8* in.	**3.92 in.**	**4.00 in.**	**3.340 3.548 in.**	**9.50 14.00 lb/ft**
79.38 mm	99.57 mm	101.60 mm	84.84 90.12 mm	14.14 20.83 kg/m
3-1/4* in.	**4.04 in.**	**4-1/2 in.**	**3.640 3.958 in.**	**12.60 20.00 lb/ft**
82.55 mm	102.62 mm	114.30 mm	92.46 100.53 mm	18.75 29.76 kg/m
3-3/8* in.	**4.16 in.**	**4-1/2 in.**	**3.697 4.000 in.**	**11.60 17.70 lb/ft**
85.73 mm	105.66 mm	114.30 mm	93.90 101.60 mm	27.90 44.28 kg/m
3-1/2* in.	**4.28 in.**	**4-1/2 in.**	**3.826 4.090 in.**	**9.50 15.50 lb/ft**
88.90 mm	108.71 mm	114.30 mm	97.18 103.89 mm	14.14 23.06 kg/m
3-5/8* in.	**4.40 in.**	**4-1/2 in.**	**3.920 4.090 in.**	**9.50 13.50 lb/ft**
92.08 mm	111.76 mm	114.30 mm	99.57 103.89 mm	14.14 20.09 kg/m
3-7/8* in.	**4.68 in.**	**5.00 in.**	**4.154 4.408 in.**	**15.00 21.00 lb/ft**
98.43 mm	118.87 mm	127.00 mm	105.51 111.96 mm	22.32 31.25 kg/m
4* in.	**4.80 in.**	**5.00 in.**	**4.276 4.560 in.**	**11.50 19.50 lb/ft**
101.60 mm	121.92 mm	127.00 mm	108.61 115.82 mm	17.11 29.02 kg/m
4-3/16* in.	**4.92 in.**	**5-1/2 in.**	**4.548 4.778 in.**	**20.00 26.00 lb/ft**
106.36 mm	124.97 mm	139.70 mm	115.52 121.36 mm	29.76 38.69 kg/m
4-7/16* in.	**5.14 in.**	**5-1/2 in.**	**4.670 4.950 in.**	**15.50 23.00 lb/ft**
112.71 mm	130.56 mm	139.70 mm	118.62 125.73 mm	23.06 34.22 kg/m
4-9/16* in.	**5.14 in.**	**5-1/2 in.**	**4.892 5.044 in.**	**13.00 17.00 lb/ft**
115.89 mm	130.56 mm	139.70 mm	124.26 128.12 mm	19.34 25.30 kg/m
5-1/2 in.	**6.50 in.**	**7.00 in.**	**6.004 6.214 in.**	**28.00 35.00 lb/ft**
139.70 mm	165.10 mm	177.80 mm	152.50 157.84 mm	41.66 52.08 kg/m
5-3/4 in.	**6.50 in.**	**7.00 in.**	**6.276 6.456 in.**	**20.00 26.00 lb/ft**
146.05 mm	165.10 mm	177.80 mm	159.41 163.98 mm	29.76 38.69 kg/m
6-3/8 in.	**7.37 in.**	**7-5/8 in.**	**6.765 7.125 in.**	**20.00 33.70 lb/ft**
161.93 mm	187.20 mm	193.68 mm	171.83 180.98 mm	29.76 50.15 kg/m

* 6 Slip Anchor Only

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CABLESA CABLE SPECIFICATIONS

CABLE TYPE	SIZE (in.)	DIAM (in.)	B.S. (lbs.)	WEIGHT (lbs.)	ARMOR WIRES IN/OUT	WIRE B.S.- lbs. IN/OUT	FREE END ELONGATION Ft/KFT/KLB	CDR RESIS OHMS/MFT	CAP Pf-Ft	MAX TEMP DEG F	MIN SHEAVE DIA (in.)	MAX VOLT
185-1YPK	3/16	0.185	3900	65	12/12	109/278	3.50	10.0	53	300	12	1000
185-1YTK	316	0.185	3900	66	12/12	109/278	3.50	10.0	63	500	12	1000
207-1YPK	2/10	0.207	4800	81	12/12	140/339	2.50	6.6	69	300	16	1000
207-1YTK	2/10	0.207	4800	82	12/12	140/339	2.50	6.6	77	500	16	1000
224-1ZPL	7/32	0.224	5600	92	12/18	212/212	2.50	4.0	58	300	12	1100
224-1ZTL	7/32	0.224	5600	94	12/18	212/212	2.50	4.0	58	500	12	1100
224-1ZTK-S75	7/32	0.224	4800	96	12/18	189/189	2.90	6.7	43	500	13	1100
224-1ZTK-MP35	7/32	0.224	5200	100	12/18	212/212	2.60	6.7	43	500	13	1100
224-1XPL	7/32	0.224	5600	94	15/15	137/280	2.20	4.0	59	300	14	1100
224-1XTL	7/32	0.224	5600	96	15/15	137/280	2.20	4.0	68	500	14	1100
224-1XTK-S75	7/32	0.224	4800	94	15/15	126/257	2.70	6.7	43	500	14	1100
224-1XTK-MP35	7/32	0.224	5200	99	15/15	139/280	2.40	6.7	42	500	14	1100
288-1ZPL	9/32	0.288	10000	154	12/18	355/355	1.60	2.8	54	300	16	1500
288-1ZTL	9/32	0.288	10000	159	12/18	355/355	1.60	2.8	55	500	16	1500
322-1ZPL	5/16	0.322	11200	188	12/18	435/435	1.20	2.8	46	300	18	1500
322-1ZTL	5/16	0.322	11200	195	12/18	435/435	1.20	2.8	45	500	18	1500
380-1ZPL	3/8	0.380	15000	253	12/18	597/597	1.00	2.8	39	300	21	1500
425-1ZPL	7/16	0.425	19500	320	12/18	775/775	0.75	2.8	33	300	24	1500
425-1ZTL	7/16	0.425	19500	334	12/18	775/775	0.75	238	34	500	24	1500
380-7SPK	3/8	0.378	13000	240	18/18	290/584	1.40	9.8	64	300	21	1000
380-7STK	3/8	0.378	13000	248	18/18	290/584	1.40	9.8	66	500	21	1000
428-7SPK	7/16	0.428	18300	310	18/18	399/745	0.90	9.8	53	300	24	1000
428-7STK	7/16	0.428	18300	317	18/18	399/745	0.90	9.8	62	500	24	1000
464-7RPK	15/32	0.464	18300	321	24/24	335/537	0.80	9.8	40	300	20	1200
464-7RFTK	15/32	0.464	18300	341	24/24	335/537	0.80	9.8	39	500	20	1200
472-7SPK	SLAMMER	0.472	22200	377	18/18	480/925	0.80	9.8	46	300	26	1200
472-SFTK	SLAMMER	0.472	22200	392	18/18	480/925	0.80	9.8	45	500	26	1200
7*521	17/32	0.521	25500	455	19/20	550/910	0.60	9.8	39	500	26	1100

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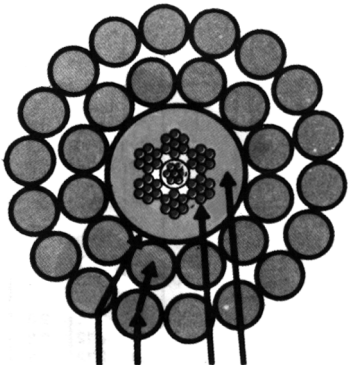
CABLE TYPE DESIGNATION



EXAMPLE

Number of electrical conductors

Number of inner/outer armor wires

Armor Wires

N- 12/18
L- 12/12
K- 15/15
F- 11/15
H- 18/18
J- 24/24
Q- Others

Nominal cable diameter in hundredths of an inch

Type of copper electrical conductor construction
R- 7 wires strand
S- 7 wires strand
P- 19 wires strand
W- 49 wires (7x7) rope
Y- Others

Type of electrical insulation
P- Propylene Copolymer
T- Teflon* FEP-100
Z-Tefzel*
X-Camtene
A-PFA*

*Dupont trade marks

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CABLE SPECIFICATIONS

Cable Type	Nom. Dia. In.	Breaking Strength lbs.	Wt. Lbs Mft.	Armor Wires In/Out	Stretch Ft/Mft/ M Lb.	Min Sheave Dia In.	Max. Cond Res. Ω/Mft	Max Armor Res. Ω/Mft.	Max. Cap. Pf/ft.	Max. Volt Pf/ft.	Insul-ation Type	Temp °F
1-N10RP	1/10	1,000	20	12/18	–	6	24	22	55	300	P	300
1-N12RP	1/8	1,600	28	12/18	6.5	7	24	13	42	300	P	300
1-N12RZ	1/8	1,600	29	12/18	6.5	7	24	13	50	300	Z	500
1-N12RA	1/8	1,600	30	12/18	6.5	7	24	13	40	300	A	550
1-L18RP	3/16	4,000	65	12/12	2.6	14	10	6.0	58	1000	P	300
1-L18RX	3/16	4,000	65	12/12	2.6	14	10	6.0	65	1000	X	400
1-L18RZ	3/16	4,000	67	12/12	2.6	14	10	6.0	65	1000	Z	500
1-L18RA	3/16	4,000	68	12/12	2.6	14	10	6.0	55	1000	A	550
1-L18RZ-MP**	3/16	4,000	72	12/12	–	14	12	28.0	65	1000	Z	500
1-L20SP	2/10	4,800	82	12/12	2.3	14	6.6	4.5	65	1000	P	300
1-L20SX	2/10	4,800	82	12/12	2.3	14	6.6	4.5	75	1000	X	400
1-L20SZ	2/10	4,800	84	12/12	2.3	14	6.6	4.5	75	1000	Z	500
1-L20SA	2/10	4,800	85	12/12	2.3	14	6.6	4.5	60	1000	A	550
1-K22PP	7/32	5,200	91	15/15	1.8	14	4.4	4.3	60	1000	P	300
1-K22PX	7/32	5,200	91	15/15	1.8	14	4.4	4.3	70	1000	X	400
1-K22PZ	7/32	5,200	94	15/15	1.8	14	4.4	4.3	70	1000	Z	500
1-K22PTZ	7/32	5,200	96	15/15	1.8	14	4.4	4.3	67	1000	T/Z	500
1-K22PA	7/32	5,200	97	15/15	1.8	14	4.4	4.3	55	1000	A	550
1-K22SP	7/32	5,200	89	15/15	1.8	14	6.6	4.3	50	1000	P	300
1-K22SX	7/32	5,200	88	15/15	1.8	14	6.6	4.3	55	1000	X	400
1-K22SZ	7/32	5,200	90	15/15	1.8	14	6.6	4.3	55	1000	Z	500
1-K22STZ	7/32	5,200	92	15/15	1.8	14	6.6	4.3	53	1000	T/Z	500
1-K22SAZ	7/32	5,200	90	15/15	1.8	14	6.6	4.3	50	1000	A/Z	500
1-K22SA	7/32	5,200	93	15/15	1.8	14	6.6	4.3	46	1000	A	550
1-F22RP	7/32	5,200	89	11/15	1.8	14	10	4.5	45	1000	P	300
1-F22RTZ	7/32	5,200	92	11/15	1.8	14	10	4.5	50	1000	T/Z	500
1-N22SP	7/32	5,200	90	12/18	1.8	14	6.6	4.4	50	1000	P	300
1-N22SZ	7/32	5,200	93	12/18	1.8	14	6.6	4.4	56	1000	Z	500
1-H22PA	7/32	5,200	94	18/18	1.8	14	3.7	4.9	52	1000	A	550
1-K22SZ-MP**	7/32	5,200	99	15/15	–	14	7.6	22.0	55	1000	Z	500
1-F22RTZ-MP**	7/32	5,200	97	11/15	–	14	12.0	21.0	50	1000	T/Z	500
1-N22SZ-MP**	7/32	5,200	97	12/18	–	14	7.6	21.5	56	1000	Z	500
1-N25PP	1/4	7,300	120	12/18	–	16	4.4	3.5	53	1000	P	300
1-N32WP	5/16	11,000	185	12/18	1.3	17	3.5	2.0	50	1500	P	300
1-N32WZX	5/16	11,000	187	12/18	1.3	17	3.5	2.0	55	1500	Z/X	420
1-N32WTZ	5/16	11,000	191	12/18	1.3	17	3.5	2.0	50	1500	T/Z	500
1-N32WTA	5/16	11,000	192	12/18	1.3	17	3.5	2.0	45	1500	T/A	550
1-N32PTZ-MP**	5/16	11,000	209	12/18		17	4.1	10.0	55	1500	T/Z	500

Note: All resistances shown in this catalogue are maximum values measured at 20° C (68° F).

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CABLE SPECIFICATIONS

Cable Type	Nom. Dia. In.	Breaking Strength Lbs.	Wt. Lb/ mft.	Armor Wires In/Out	Stretch Ft/Mft/ M lb.	Min. Sheave Dia.In.	Max. Cond. Res. Ω/Mft.	Max. Armor Res. Ω/Mft.	Max. Cap. pf/ft.	Max. Volt D.C.	Insul-ation Type	Temp °F
1-N38WP	3/8	15,000	253	12/18	1.0	20	3.5	1.5	40	1500	P	300
1-N38WZX	3/8	15,000	255	12/18	1.0	20	3.5	1.5	50	1500	Z/X	420
1-N38WTZ	3/8	15,000	260	12/18	1.0	20	3.5	1.5	45	1500	T/Z	500
1-N38WTA	3/8	15,000	262	12/18	1.0	20	3.5	1.5	35	1500	T/A	550
1-N42WP	7/16	19,500	318	12/18	0.7	23	3.5	1.2	40	1500	P	300
1-N42WZX	7/16	19,500	320	12/18	0.7	23	3.5	1.2	45	1500	Z/X	420
1-N42WTZ	7/16	19,500	325	12/18	0.7	23	3.5	1.2	42	1500	T/Z	500
4-H18RPX	3/16	3,100	61	18/18	–	14	24	6.8	40	300	P/X	300
4-H18RZX	3/16	3,100	62	18/18	–	14	24	6.8	50	300	Z/X	420
4-H18RTZ	3/16	3,100	63	18/18	–	14	24	6.8	45	300	T/Z	500
7-H25RP	1/4	6,200	110	18/18	2.0	16	25	5.3	70	300	P	300
7-H32RP	5/16	9,500	180	18/18	1.8	17	16	2.3	60	1000	P	300
7-H35RP	11/32	12,000	210	18/18	1.6	19	16	1.9	55	1000	P	300
7-H38RP	3/8	13,000	240	18/18	1.4	20	10.4	1.7	67	1000	P	300
7-H42RP	7/16	18,500	314	18/18	.85	23	10.4	1.3	58	1000	P	300
7-H42RX	7/16	18,500	313	18/18	.85	23	10.4	1.3	65	1000	X	400
7-H42RZ	7/16	18,500	317	18/18	.85	23	10.4	1.3	65	1000	Z	500
7-H42RTZ	7/16	18,500	320	18/18	.85	23	10.4	1.3	60	1000	T/Z	500
7-H42RA	7/16	18,500	321	18/18	.85	23	10.4	1.3	55	1000	A	550
7-J46RP	15/32	18,000	326	24/24	.80	20	10.4	1.2	44	1000	P	300
7-J46RX	15/32	18,000	325	24/24	.80	20	10.4	1.2	55	1000	X	400
7-J46RTZ	15/32	18,000	332	24/24	.80	20	10.4	1.2	45	1000	T/Z	500
7-J46RA	15/32	18,000	334	24/24	.80	20	10.4	1.2	40	1000	A	550
7-Q52RP	17/32	24,500	435	19/20	–	25	10.4	1.0	40	1000	P	300
7-Q52RTZ	17/32	24,500	442	19/20	–	25	10.4	1.0	45	1000	T/Z	500

Swab Lines 3/16'' and 1/4''

Sand Lines 1/2'', 9/16'', 5/8'', 3/4'', 7/8'', and 1''

Slick Line Wires .066'', .072'', .082'', .092'', and .108''

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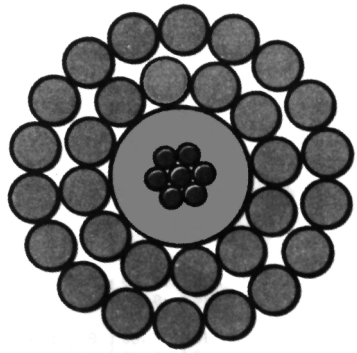
1/10'' and 1/8'' Monocables

camesa cable

Specifications



1/10'' MONOCABLE

ARMOR

Inner - 12 wires .014'' Right Lay, O.D. 0.074
Outer - 18 Wires .014'' Left Lay
Cable Diameter - .100'' ±.004''
Breaking Strength - 1,000 Lbs Min.
Weight - 20 Lbs. ±1 lb/Mft.
Resistance - 22Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Constr.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	In.	In.	Ω/Mft.	Pf/ft.	In.	Max.V.D.C.	Min MΩ/Mft
1-N10RP	300	Propylene	.012''	7 x .0085''	24	55	.049''	300	1500

1/8'' MONOCABLE

ARMOR

Inner - 12 wires .017'' Right Lay, O.D. 0.089''
Outer - 18 Wires .017'' Left Lay
Cable Diameter - .125'' ±.004''
Breaking Strength - 1,600 Lbs Min,
Weight - 29 Lbs. ±1 lb/Mft.
Resistance - 13Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-N12RP	300	Propylene	.018''	7 x .0085''	24	42	.060''	300	1500
1-N12RZ	500	Tefzel	.018''	7 x .0085''	24	50	.060''	300	1500
1-N12RA	550	PFA	.018''	7 x .0085''	24	40	.060''	300	1500

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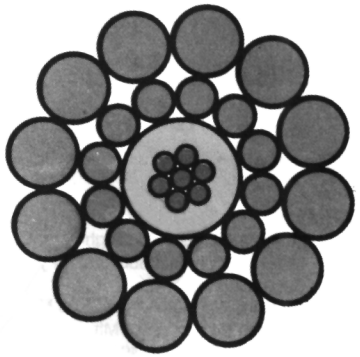
3/16'' and 2/10'' Monocables

carnesa cable



Specifications

3/16'' MONOCABLES

ARMOR

Inner - 12 wires .022'' Right Lay, O.D. 0.113''
Outer - 18 Wires .0355'' Left Lay
Cable Diameter - .185'' ±.004''
Breaking Strength - 4,000 Lbs Min,
Weight - 67 Lbs. ±2 lb/Mft.
Resistance - 6.0 Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-L18RP	300	Propylene	.018''	7 x .0128''	10	58	.074''	1000	1500
1-L18RX	400	Camtene	.018''	7 x .0128''	10	65	.074''	1000	1500
1-L18RZ	500	Tefzel	.018''	7 x .0128''	10	65	.074''	1000	1500
1-L18RA	550	PFA	.018''	7 x .0128''	10	55	.074''	1000	1500

2/10'' MONOCABLE

ARMOR

Inner - 12 wires .025'' Right Lay, O.D. 0.131''
Outer - 18 Wires .039'' Left Lay
Cable Diameter - .207'' ±.005''
Breaking Strength - 4,800 Lbs Min,
Weight - 84 Lbs. ±3 lb/Mft.
Resistance - 4.5 Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	in	in	Ω /Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-L20SP	300	Propylene	.018''	7 x .0159''	6.6	65	.083''	1000	1500
1-L20SX	400	Camtene	.018''	7 x .0159''	6.6	75	.083''	1000	1500
1-L20SZ	500	Tefzel	.108''	7 x .0159''	6.6	75	.083''	1000	1500
1-L20SA	550	PFA	.018''	7 x .0159''	6.6	60	.083''	1000	1500

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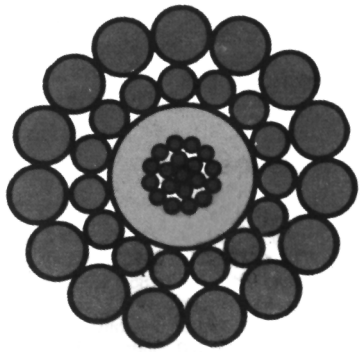
7/32'' Monocable

camesa cable

Specifications



7/32'' MONOCABLE

ARMOR

Inner - 15 wires .025'' Right Lay, O.D. 0.156''
Outer - 15 Wires .0355'' Left Lay
Cable Diameter - .224'' ±.005''
Breaking Strength - 5,200 Lbs Min,
Weight - 94 Lbs. ±3 lb/Mft.
Resistance - 4.3Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-K22PP	300	Propylene	.025''	19 x .0119''	4.4	60	.106''	1000	1500
1-K22PX	400	Camtene	.025''	19 x .0119''	4.4	70	.106''	1000	1500
1-K22PZ	500	Tefzel	.025''	19 x .0119''	4.4	70	.106''	1000	1500
1-K22PTZ	500	Teflon Tefzel	.012'' .013''	19 x .0119''	4.4	67	.106''	1000	1500
1-K22PA	550	PFA	.025''	19 x .0119''	4.4	55	.106''	1000	1500
1-K22SP	300	Propylene	.030''	7 x .0159''	6.6	50	.106''	1000	1500
1-K22SX	400	Camtene	.030''	7 x .0159''	6.6	55	.106''	1000	1500
1-K22SZ	500	Tefzel	.030''	7 x .0159''	6.6	55	.106''	1000	1500
1-K22STZ	500	Teflon Tefzel	.017'' .013''	7 x .0159''	6.6	53	.106''	1000	1500
1-K22SAZ	500	PFA Tefzel	.017'' .013''	7 x .0159''	6.6	50	.106''	1000	1500
1-K22SA	550	PFA	.030''	7 x .0159''	6.6	46	.106''	1000	1500

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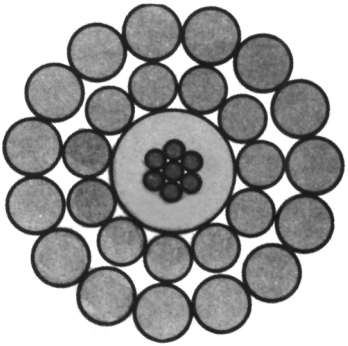
7/32'' Monocables

carnesa cable



Specifications

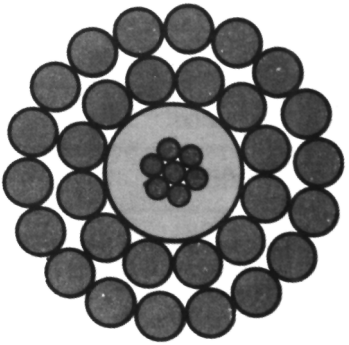
7/32'' MONOCABLES

ARMOR

Inner - 11 Wires .0031'' Right Lay, O.D. 0.151'
Outer - 15 Wires .0355'' Left Lay
Cable Diameter - .221'' ±.005''
Breaking Strength - 5,200 Lbs. Min.
Weight - 90 Lbs. ±3 Lbs./Mft.
Resistance - 4.5 Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-F22RP	300	Propylene	.027''	7 x .0128''	10.0	45	.092''	1000	1500
1-F22RTZ	500	Teflon Tefzel	.016'' .011''	7 x .0128''	10.0	50	.092''	1000	1500



7/32'' MONOCABLE

ARMOR

Inner - 12 Wires .0031'' Right Lay, O.D. 0.163''
Outer - 18 Wires .031'' Left Lay
Cable Diameter - .224'' ±.005''
Breaking Strength - 5,200 Lbs. Min.
Weight - 92 Lbs. ±3 Lbs./Mft.
Resistance - 4.4 Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-N22SP	300	Propylene	.031''	7 x .0159''	6.6	50	.107''	1000	1500
1-N22SZ	500	Tefzel	.031''	7 x .0159''	6.6	56	.107''	1000	1500

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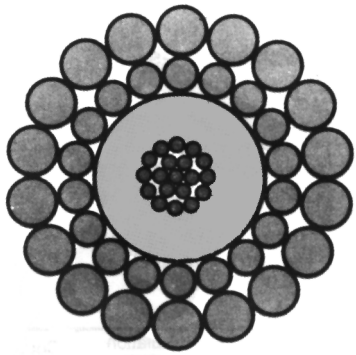
7/32'' & 1/4'' Monocables

camesa cable

Specifications



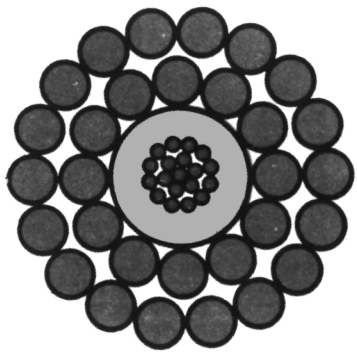
7/32'' MONOCABLES

ARMOR

Inner - 18 Wires .022'' Right Lay, O.D. 0.166''
Outer - 18 Wires .031'' Left Lay
Cable Diameter - .225'' ±.005''
Breaking Strength - 5,200 Lbs. Min.
Weight - 94 Lbs. ±3 Lbs./Mft.
Resistance - 4.9 Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-H22PA	550	PFA	.032''	7 x .0128'	3.7	50	.125''	1000	1500



1/4''MONOCABLE

ARMOR

Inner - 12 Wires .0355'' Right Lay, O.D. 0.183''
Outer - 18 Wires .0355'' Left Lay
Cable Diameter - .250'' ±.005''
Breaking Strength - 7,300 Lbs. Min.
Weight - 120 Lbs. ±4 Lbs./Mft.
Resistance - 3.5 Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-N25PP	300	Propylene	.032''	19 x .0119''	4.4	53	.120''	1000	1500

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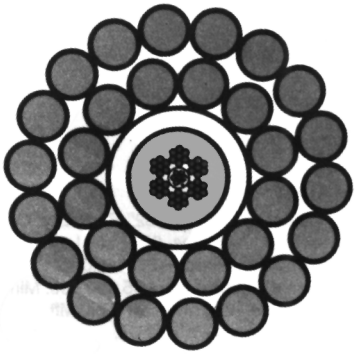
5/16'' Monocables

camesa cable

Specifications



5/16'' Monocables

Armor

Inner - 12 Wires .0455'' Right Lay, O.D. 0.233''
Outer - 18 Wires .0455'' Left Lay
Cable Diameter - .322'' ±.005''
Breaking Strength - 11,000 Lbs. Min.
Weight - 190 Lbs. ±6 Lbs./Mft.
Resistance - 2.0 Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitace			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-N32WP	300	Propylene	.040''	7 x 7 (49/.0085")	3.5	50	.154''	1500	1500
1-N32WZX	420	Tefzel Camtene	.024'' .016''	7 x 7 (49/.0085'')	3.5	55	.154''	1500	1500
1-N32WTZ	500	Teflon Tefzel	.024'' .016''	7 x 7 (49/.0085'')	3.5	50	.154''	1500	1500
1-N32WTA	550	Teflon PFA	.024'' .016''	7 x 7 (49/.0085'')	3.5	45	.154''	1500	1500

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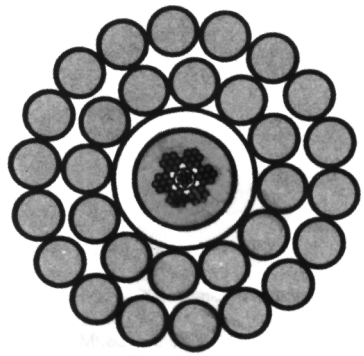
3/8'' And 7/16'' Monocables

camesa cable



Specifications

3/8'' MONOCABLES

ARMOR

Inner - 12 Wires .052'' Right Lay, O.D. 0.275''
Outer - 18 Wires .052'' Left Lay
Cable Diameter - .380'' ±.006''
Breaking Strength - 15,000 Lbs. Min.
Weight - 260 Lbs. ±10 Lbs./Mft.
Resistance - 1.5 Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-N38WP	300	Propylene	.055''	7 x 7 (49/.0085'')	3.5	40	.183''	1500	1500
1-N38WZX	420	Tefzel Camtene	.027'' .028''	7 x 7 (49/.0085'')	3.5	50	.183''	1500	1500
1-N38WTZ	500	Teflon Tefzel	.027'' .028''	7 x 7 (49/.0085'')	3.5	45	.183''	1500	1500
1-N38WTA	550	Teflon PFA	.027'' .028''	7 x 7 (49/.0085'')	3.5	35	.183''	1500	1500

7/16'' MONOCABLE

ARMOR

Inner - 12 Wires .059'' Right Lay, O.D. 0.307''
Outer - 18 Wires .059'' Left Lay
Cable Diameter - .425'' ±.006''
Breaking Strength - 19,500 Lbs. Min.
Weight - 320 Lbs. ±10 Lbs./Mft.
Resistance - 1.2 Ω/Mft

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-N42WP	300	Propylene	.062''	7 x 7 (49/.0085'')	3.5	40	.200''	1500	1500
1-N42WZX	420	Tefzel Camtene	.032'' .030''	7 x 7 (49/.0085'')	3.5	45	.200''	1500	1500
1-N42WTZ	500	Teflon Tefzel	.032'' .030''	7 x 7 (49/.0085'')	3.5	42	.200''	1500	1500

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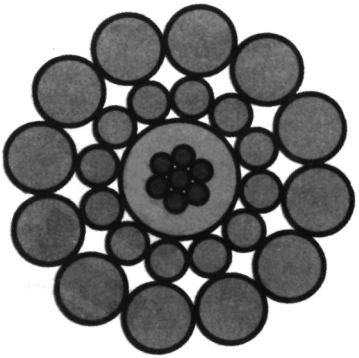
3/16'' and 7/32'' Monocables for H_2S Service

camesa cable

Specifications

Special cables manufactured to operate in hydrog sulfide (H_2S) oil wells & other severe well condition



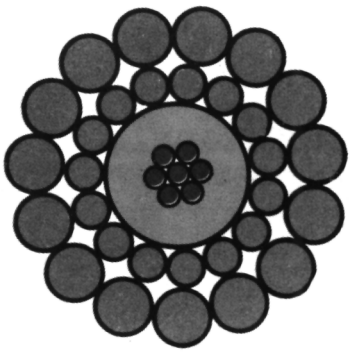
3/16'' MONOCABLES

ARMOR MP-35N*

Inner - 12 Wires .022'' Right Lay, O.D. 0.113''
Outer - 12 Wires .0355'' Left Lay
Cable Diameter - .185'' ±..004''
Breaking Strength - 4,000 Lbs. Min.
Weight - 72 Lbs. ±2 Lbs./Mft.
Resistance - 28.0 Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitace			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-L18RZ-MP	500	Tefzel	.018''	7 x .0128**	12	65	.074''	1000	1500



7/32'' MONOCABLE

ARMOR MP-35N

Inner - 15 Wires .025'' Right Lay, O.D. 0.156''
Outer - 15 Wires .0355'' Left Lay
Cable Diameter - .224'' ±.005''
Breaking Strength - 5,200 Lbs. Min.
Weight - 99 Lbs. ±3 Lbs./Mft.
Resistance - 22.0 Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitace			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-K22SZ-MP	500	Tefzel	.030''	7 x 0159''**	7.6	55	.106''	1000	1500

* MP-35N a special cobalt-nickel Alloy trademarked by S.P.S. Technologies.
** All conductors have nickel coating for H_2S Resistance.

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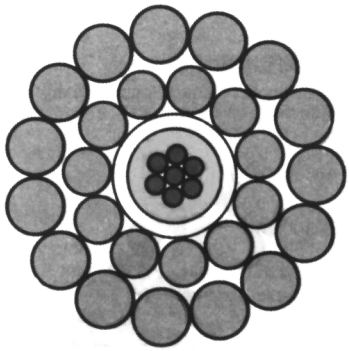
7/32" Monocables for H_2S Service

carnesa cable

Specifications

Special cables manufactured to operate in hydroge
sulfide (H_2S) oil wells & other severe well conditions



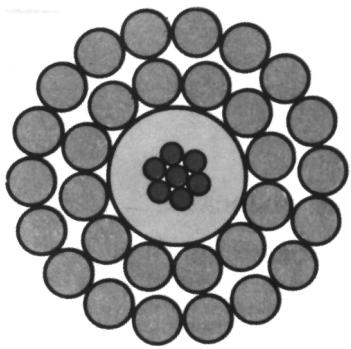
7/32'' MONOCABLES

ARMOR MP-35N*

Inner - 11 Wires .031'' Right Lay, O.D. 0.151''
Outer - 15 Wires .0355'' Left Lay
Cable Diameter - .221'' ±.005''
Breaking Strength - 5,200 Lbs. Min.
Weight - 97 Lbs. ±3 Lbs./Mft.
Resistance - 21.0 Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-F22RTZ-MP	500	Teflon Tefzel	.016'' .011	7 x .0128**	12	50	.092''	1000	1500



7/32'' MONOCABLE

ARMOR MP-35N*

Inner - 12 Wires .031'' Right Lay, O.D. 0.163''
Outer - 18 Wires .031'' Left Lay
Cable Diameter - .224'' ±.005''
Breaking Strength - 5,200 Lbs. Min.
Weight - 97 Lbs. ±3 Lbs./Mft.
Resistance - 21.5 Ω/Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	in	in	/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-N22SZ-MP	500	Tefzel	.031''	7 x 0159''**	7.6	56	.107''	1000	1500

* MP-35N is a special cobalt-nickel Alloy trademarked by S.P.S. Technologies.
** All conductors have nickel coating for H_2S Resistance.

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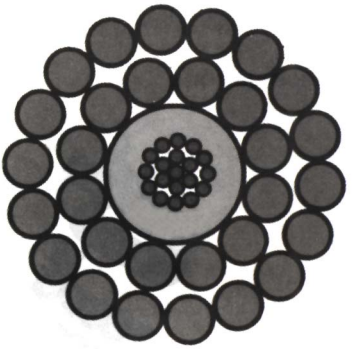
5/16'' Monocables for H_2S Service

camesa cable



Specifications

Special cables manufactured to operate in hydroge sulfide (H_2S) oil wells & other severe well conditions

5/16'' MONOCABLE

ARMOR MP-35N*

Inner - 12 Wires .0445'' Right Lay, O.D. 0.233''
Outer - 18 Wires .0445'' Left Lay
Cable Diameter - .322'' ±.005''
Breaking Strength - 11,000 Lbs. Min.
Weight - 209 Lbs. ± 6 Lbs./Mft.
Resistance - 10.0Ω /Mft.

CORE

Cable Type	Temp Rating	Insulation		Copper Const.	Conductor		O.D.	Voltage	Insulation Resistance
		Type	Thick		Resistance	Capacitance			
	°F	Polymer	in	in	Ω/Mft	Pf/ft	in.	Max V.D.C.	Min MΩ/Mft
1-N32PTZ-MP	500	Teflon Tefzel	.025'' .017''	19 x 0142''**	4.1	55	.154''	1500	1500

* MP-35N is a special cobalt-nickel Alloy trademarked by S.P.S. Technologies.
** All conductors have nickel coating for H_2S Resistance.

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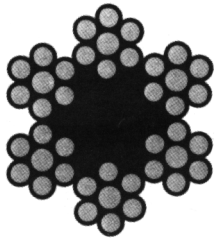
Sand lines

camesa cable

Specifications



SAND LINES 6 X 7 (6/1)

1/2'' TYPE 50 SD 6 Strands 6/.056'' over 1/.060'' Bright Improved Plow Steel wires and Polypropylene Core. Diameter .500'' Weight in Air 380 lbs/Mft. Breaking Strength 20,600 lbs.	**3/4'' TYPE 75 SD** 6 Strands 6/.068'' over 1/.080'' Bright Improved Plow Steel wires and Polypropylene Core. Diameter .750'' Weight in Air 840 lbs/Mft. Breaking Strength 45,400 lbs.
9/16'' TYPE 56 SD 6 Strands 6/.060'' over 1/.065'' Bright Improved Plow Steel wires and Polypropylene Core. Diameter .563'' Weight in Air 480 lbs/Mft. Breaking Strength 26,000 lbs.	**7/8'' TYPE 87 SD** 6 Strands 6/.094'' over 1/.103'' Bright Improved Plow Steel wires and Polypropylene Core. Diameter .875'' Weight in Air 1,150 lbs/Mft. Breaking Strength 61,400 lbs.
5/8'' TYPE 62 SD 6 Strands 6/.068'' over 1/.080'' Bright Improved Plow Steel wires and Polypropylene Core. Diameter .625'' Weight in Air 590 lbs/Mft. Breaking Strength 31,800 lbs.	**1'' TYPE 100 SD** 6 Strands 6/.108'' over 1/.122'' Bright Improved Plow Steel wires and Polypropylene Core. Diameter 1.000'' Weight in Air 1,500 lbs/Mft. Breaking Strength 79,400 lbs.

The wire ropes shown in this publication comply with the American Petroleum Institute's Specification API 9A.

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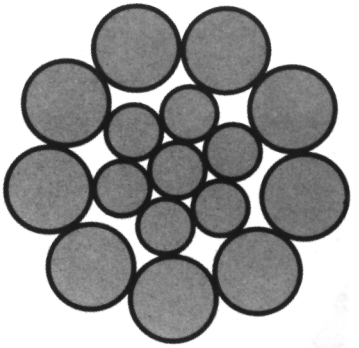
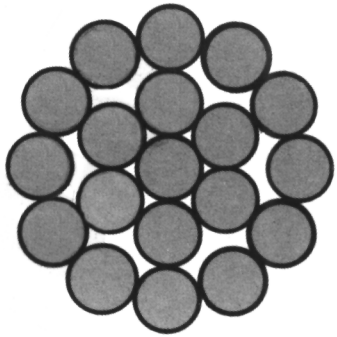
CAMESA CABLE
SWAB LINES

Specifications





	TYPE 18 SL	TYPE 25 SL
Construction	1 x 16 3/16''	1 x 19 1/4''
INNER LAYER DIA. Centre wire diameter Outer wire, number Outer wire, diameter Lay distance	0.0096 in. 0.032 in 6 0.032 in. 1.0 in	0.154 in. 0.058 in. 6 0.048 in. 1.32 in
OUTER LAYER DIAM Number of Wires Wire Diameter Lay distance	0.0183 in. 9 0.0435 in 1.6 in.	0.250 in. 12 0.048 in. 2.0 in.
Mechanical Characteristics		
Breaking strength Weight	5,000 lbs. 67 lb/Mft.	8,500 lbs. 132 lb/Mft.

Note: Constructions 1 x 17 and 1 x 18 can also be provided.

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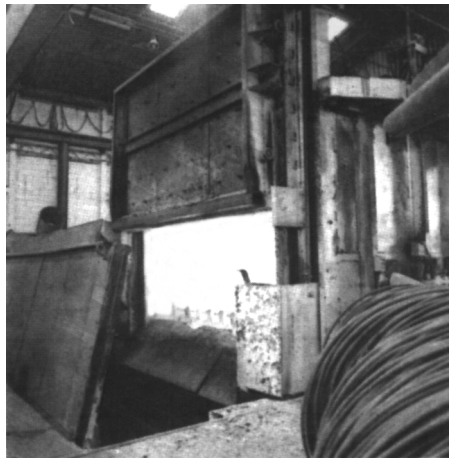
CAMESA CABLE
SLICK LINE WIRE

Specifications



Nominal diameter	in.	.066	.072	.082	.092	.108
Tolerance on diameter	in.	.001	.001	.001	.001	.001
Min. Breaking Strength: API-9A	Lbs.	811	961	1239	1547	2150
CAMESA UHT-2*	Lbs.	1045	1215	1530	1930	2585
CAMESA UHT-3*	Lbs.	1090	1260	1595	2010	2700

Wire supplied in weld-free continuous lengths from 20,000 to 25,000 ft.

* The camesa UHT Bright carbon steel wires provide extra high strength for special applications.

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5/16'' ELECTRO-MECHANICAL CABLE STRETCH CHART

Stretch Factor = 1.3 ft./1000 lbs. pull/1000 ft.
Pounds of Pull

Cable Length — **Safe** — **Possible Damage** — **Permanent Damage**

	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
1000	1.3	2.6	3.9	5.2	6.5	7.8	9.1	10.4	11.7	13
2000	2.6	5.2	7.8	10.4	13	15.6	18.2	20.8	23.4	26
3000	3.9	7.8	11.7	15.6	19.5	23.4	27.3	31.2	35.1	39
4000	5.2	10.4	15.6	20.8	26.0	31.2	36.4	41.6	46.8	52
5000	6.5	13.0	19.5	26.0	32.5	39.0	45.5	52.0	58.5	65
6000	7.8	15.6	23.4	31.2	39.0	46.8	54.6	62.4	70.2	78
7000	9.1	18.2	27.3	36.4	45.5	54.6	63.7	72.8	81.9	91
8000	10.4	20.8	31.2	41.6	52.0	62.4	72.8	83.2	93.6	104
9000	11.7	23.4	35.1	46.8	58.5	70.2	81.9	93.6	105.3	117
10000	13.0	26.0	39.0	52.0	65.0	78.0	91.0	104	117	130
11000	14.3	28.6	42.9	57.2	71.5	85.8	100.1	114.4	128.7	143
12000	15.6	31.2	46.8	62.4	78.0	93.6	109.2	124.8	140.4	156
13000	16.9	33.8	50.7	67.6	84.5	101.4	118.3	135.2	152.1	169
14000	18.2	36.4	54.6	72.8	91.0	109.2	127.4	145.6	163.8	182
15000	19.5	39.0	58.5	78.0	97.5	117.0	136.5	156	175.5	195
16000	20.8	41.6	62.4	83.2	104	124.8	145.6	166.4	187.2	208
17000	22.1	44.2	66.3	88.4	110.5	132.6	154.7	176.8	198.9	221
18000	23.4	46.8	70.2	93.6	117	140.4	163.8	187.2	210.6	234
19000	24.7	49.4	74.1	98.8	123.5	148.2	172.9	197.6	222.3	247
20000	26.0	52.0	78.0	104	130.5	156	182	208	234	260
21000	27.3	54.6	81.9	109.2	136.5	163.8	191.1	218.4	245.7	273
22000	28.6	57.2	85.8	114.4	143	171.6	200.2	228.8	257.4	286
23000	29.9	59.8	89.7	119.6	149.5	179.4	209.3	239.2	269.1	299
24000	31.2	62.4	93.6	124.8	156	187.2	218.4	249.6	280.8	312
25000	32.5	65	97.5	130	162.5	195	227.5	260	292.5	325
26000	33.8	67.6	101.4	135.2	169	202.8	236.6	270.4	304.2	338

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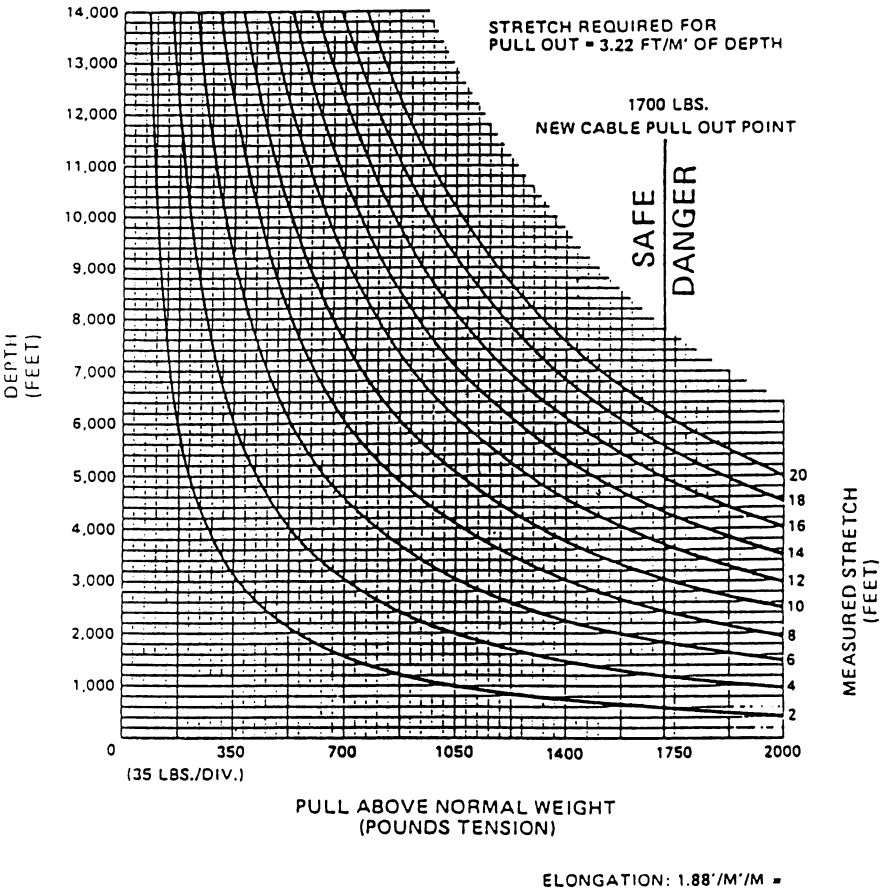
STRETCH CHART - SINGLE CONDUCTOR
7/32" CABLE



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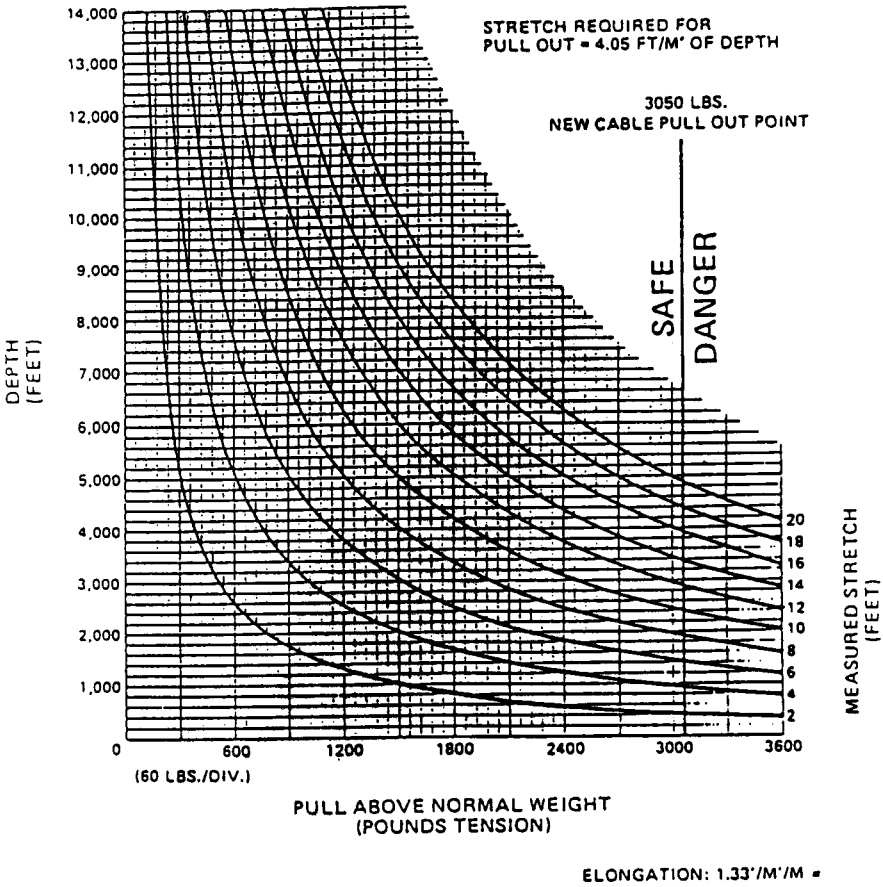
STRETCH CHART - SINGLE CONDUCTOR
5/16" CABLE



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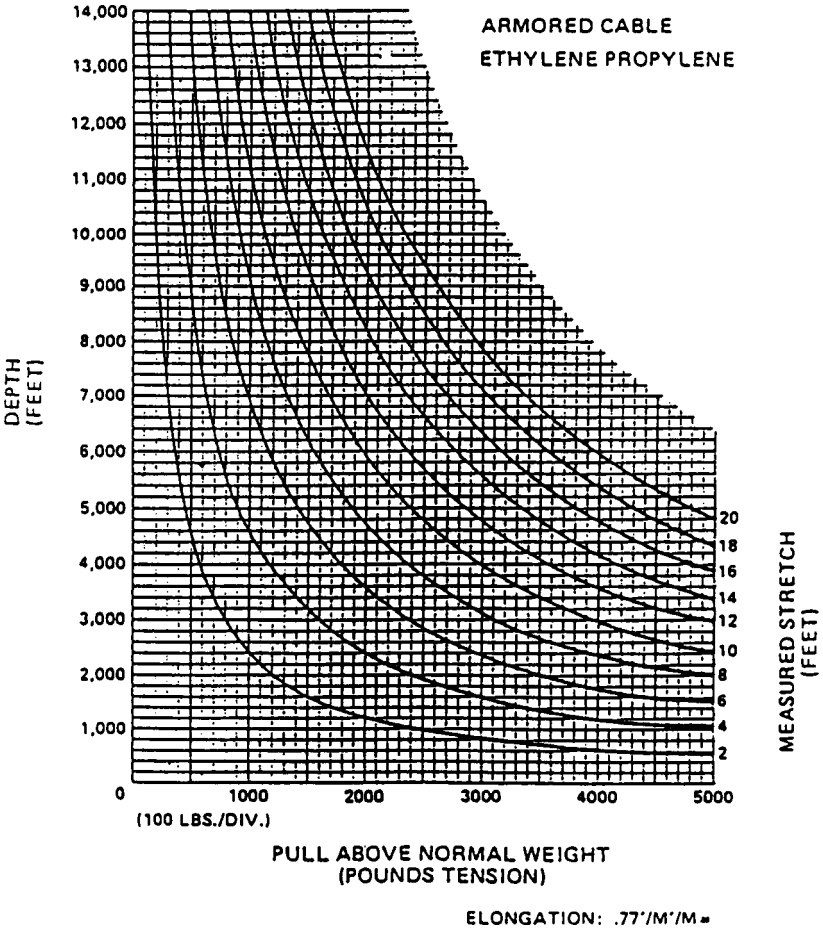
STRETCH CHART - SEVEN CONDUCTOR 7/16" CABLE



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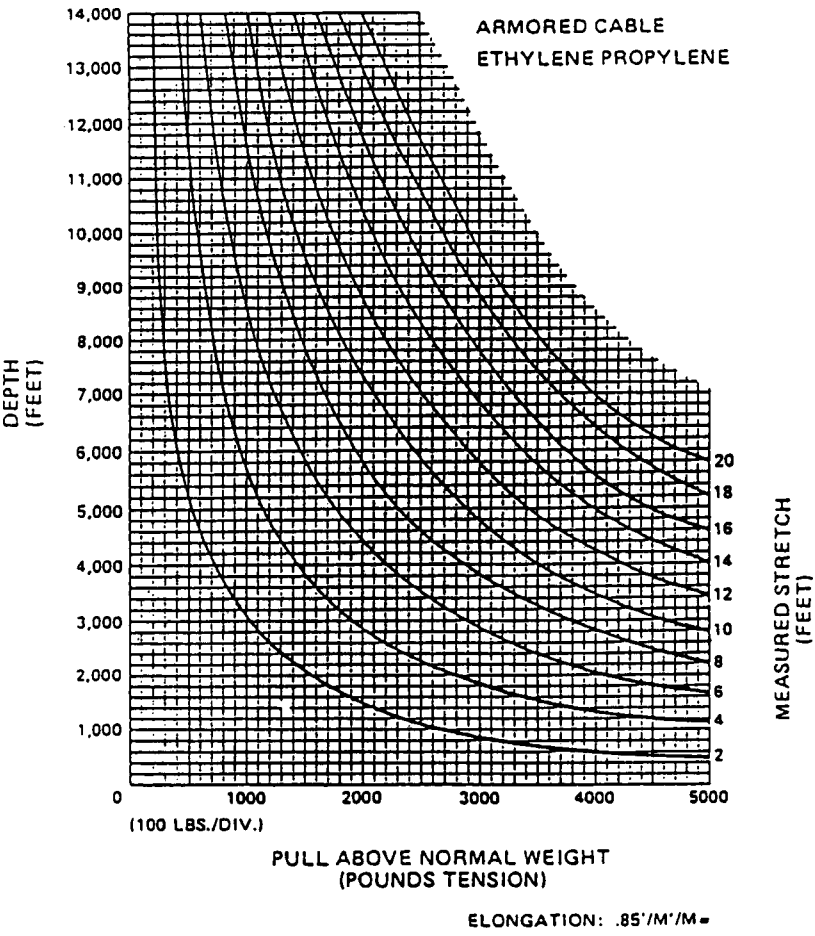
STRETCH CHART - SEVEN CONDUCTOR
15/32" CABLE



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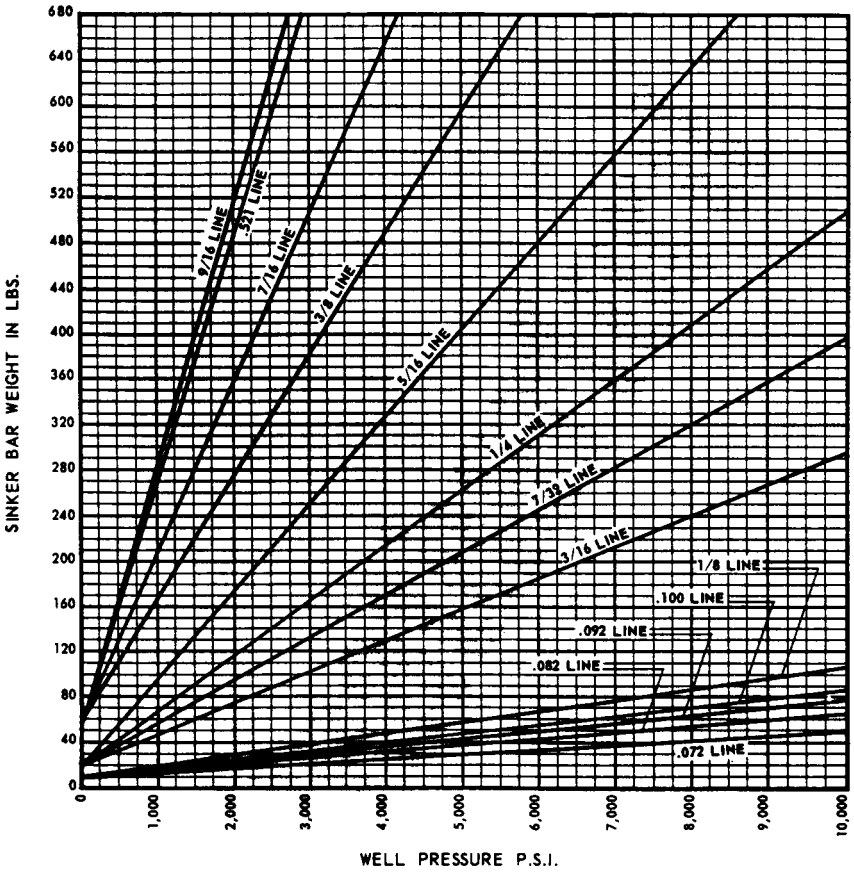
SINKER BAR WEIGHT VS. WELL PRESSURE AND FRICTION @ BALANCE POINT (LINE WEIGHT DISREGARDED)



NOTE: SINKER BAR WEIGHT GIVEN IS AT BALANCE POINT. ADD WEIGHT AS DESIRED TO OBTAIN DOWNWARD MOVEMENT.

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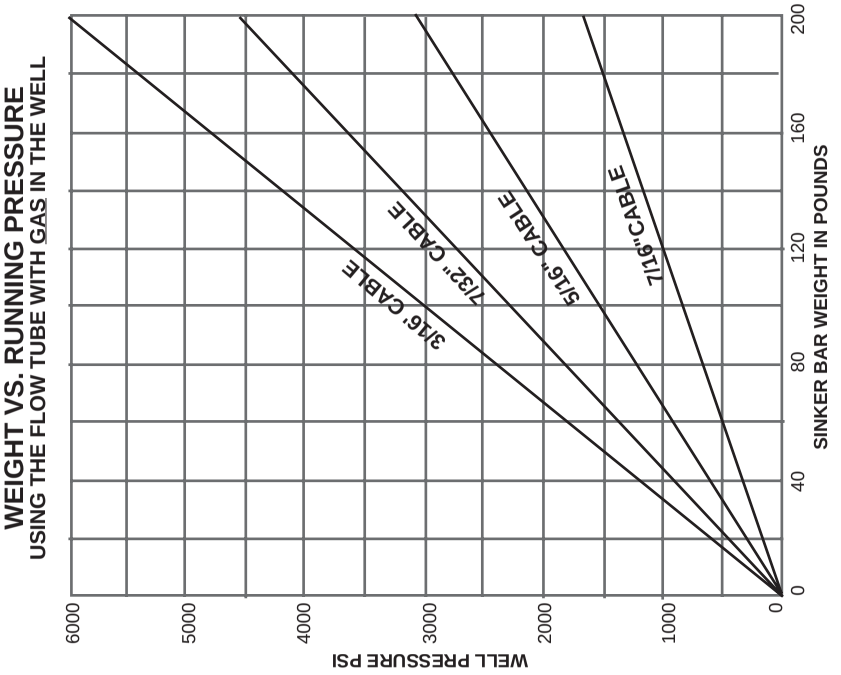

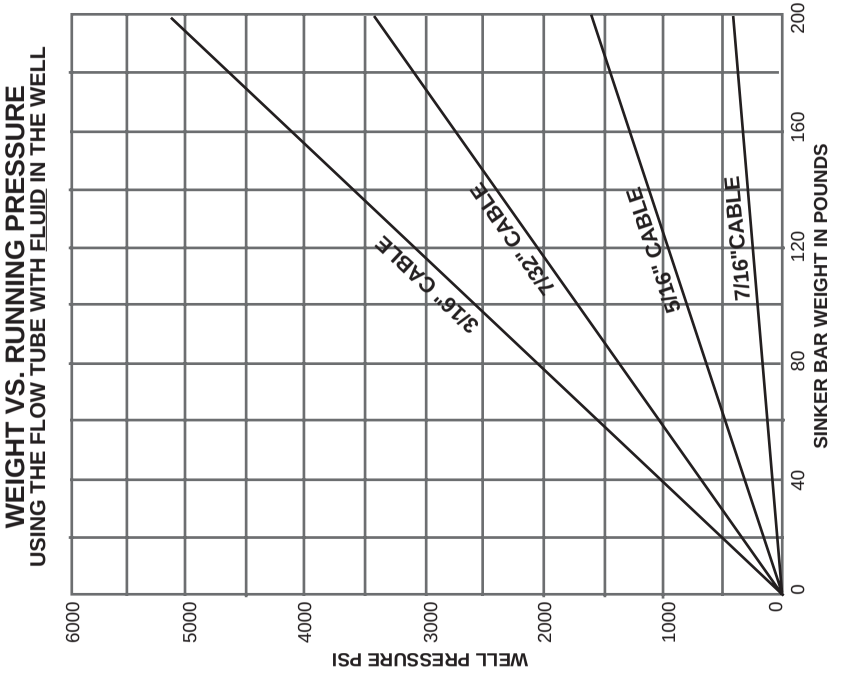

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FREEPOINT CHART FOR 1'' & 1-1/4'' COIL TUBING CLOSE ESTIMATION FROM INDEPENDENT SERVICE COMPANY

Use of Freepoint Chart

1) Pull pipe into tension with at least 500 pounds of weight over and above the weight of the tubing in the hole.

2) Make a visible reference mark on the pipe.

3) Increase pull on pipe in increments of 1,000 pounds over original weight of pipe in tension (Step 1).

4) Measure the amount of pipe stretch that has occurred, using the original reference mark from step 2 as the starting point.

5) Subtract original weight reading from the final weight reading to determine the difference in weight and pull.

6) Using the chart, locate the stretch factor and the pull factor on the chart. Read the freepoint on the chart where the two columns meet. Readings given are the depth from the surface in feet. (From the point of measurement of reference marks.)

Example: 7600' of 1'' pipe is stuck in the hole. Locate the estimated freepoint.

Procedure: Using approximate pipe weight of .9 pounds per foot, string weight is found to weight 6,840 pounds. (7600 x .9)

1) Pull string to tension by pulling weight to 7500 pounds. Make a reference mark on the pipe.

2) Pull string to 11,500 pounds (4,000 pound difference) and measure the amount of stretch that has occurred. For purposes of working the problem we will say that 2'6'' has occurred.

3) Difference in pull was 4,000 pounds and the stretch was 2'6''. Plot these factors in the chart and read vertical and horizontal columns to intersection and read freepoint at 4,622'.

Note:
Due to the inaccuracies that are present when making measurements and the visual judgment that is required, this chart should be used for estimates only.

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FOR 1'' COILED TUBING TABLE #1

Pull on Pipe =	2000#	3000#	4000#	5000#	6000#	7000#	8000#	9000#	10000#	11000#	12000#
6''	1849'	1233'	924'	740'	616'	528'	462'	411'	368'	336'	308'
9''	2773'	1849'	1387'	1109'	924'	792'	693'	616'	555'	504'	462'
1'0''	3698'	2465'	1849'	1479'	1233'	1056'	924'	822'	740'	672'	616'
1'3''	4622'	3081'	2311'	1849'	1541'	1321'	1155'	1027'	924'	840'	770'
1'6''	5546'	3968'	2733'	2219'	1849'	1585'	1387'	1233'	1109'	1008'	924'
1'9''	6571'	4314'	3235'	2588'	2157'	1849'	1618'	1438'	1294'	1176'	1078'
2'0''	7395'	4930'	3698'	2958	2465'	2113'	1849'	1643'	1479'	1345'	1233'
2'3''	8319'	5546'	4160'	3328'	2773'	2377'	2080'	1849'	1664'	1513'	1387'
2'6''	9244'	6163'	4622'	3698'	3081'	2641'	2311'	2054'	1849'	1681'	1541'
2'9''	10168'	6779'	5084'	4067'	3389'	2905'	2542'	2260'	2034'	1849'	1695'
3'0''	11093'	7395'	5546'	4437'	3698'	3169'	2773'	2465'	2219'	2017'	1849'
3'3''	12017'	8011'	6008'	4807'	4006'	3433'	3004'	2670'	2403'	2185'	2003'
3'6''	12941'	8628'	6471'	5177'	4314'	3698'	3235'	2876'	2588'	2353'	2157'
3'9''	13866'	9244'	6933'	5546'	4622'	3962'	3466'	3081'	2773'	2521'	2311'
4'0''	14790'	9860'	7395'	5916'	4930'	4226'	3698'	3287'	2958'	2689'	2465'
4'3''	15714'	10476'	7857'	6286'	5238'	4490'	3929'	3492'	3143'	2857'	2619'
4'6''	16639'	11093'	8319'	6656'	5546'	4754'	4160'	3698'	3328'	3025'	2773'
4'9''	17563'	11709'	8782'	7025'	5854'	5018'	4391'	3903'	3513'	3193'	2927'
5'0''	18488'	12325'	9244'	7395'	6163'	5282'	4622'	4108'	3698'	3361'	3081'
5'3''		12941'	9706'	7765'	6470'	5546'	4853'	4314'	3882'	3529'	3235
5'6''		13588'	10168'	8135'	6779'	5810'	5084'	4519'	4067'	3698'	3389'
5'9''		14174'	10630'	8504'	7087'	6074'	5315'	4725'	4252'	3866'	3543'
6'0''		14790'	11093'	8874'	7395'	6339'	5546'	4930'	4437'	4034'	3698'
6'3''		15406'	11555'	9244'	7703'	6603'	5777'	5135'	4622'	4202'	3852'
6'6''		16023'	12017'	9614'	8011'	6867'	6088'	5341'	4807'	4370'	4067'
7'0''		17255'	12941'	10353'	8628'	7395'	6471'	5752'	5177'	4706'	4314'
7'3''		17871'	13403'	10723'	8936'	7659'	6702'	5957'	5361'	4874'	4468'
7'6''		18488'	13866'	11093'	9244'	7923'	6933'	6163'	5546'	5042'	4622'
7'9''			14328'	11462'	9552'	8187'	7164'	6368'	5731'	5210'	4776'
8'0''			14790'	11832'	9860'	8451'	7395'	6573'	5916'	5378'	4930'
8'3''			15252'	12202'	10168'	8716'	7626'	6779'	6101'	5546'	5084'
8'6''			15714'	12572'	10476'	8980'	7857'	6984'	6286'	5714'	5238'
8'9''			16177'	12941'	10784'	9244'	8088'	7190'	6471'	5882'	5392'
9'0''			16639'	13311'	11093'	9508'	8319'	7395'	6656'	6050'	5546'
9'3''			17101'	13681'	11401'	9772'	8550'	7600'	6840'	6219'	5700'
9'6''			17563'	14051'	11709'	10036'	8782'	7806'	7025'	6387'	5854'
9'9''			18025'	14420'	12017'	10300'	9013'	8011'	7210'	6555'	6008'
10'0''				14790'	12325'	10564'	9244'	8217'	7395'	6723'	6163'
10'3''				15160'	12633'	10828'	9475'	8422'	7580'	6891'	6317'
10'6''				15530'	12941'	11093'	9706'	8628'	7765'	7059'	6471'
10'9''				15899'	13241'	11357'	9937'	8832'	7950'	7227'	6625'
11'0''				16269'	13558'	11621'	10168'	9035'	8135'	7395'	6779'
11'3''				16639'	13866'	11885'	10399'	9244'	8319'	7563'	6933'
11'6''				17009'	14174'	12149'	10630'	9449'	8504'	7731'	7087'
11'9''				17378'	14482'	12413'	10861'	9655'	8684'	7899'	7241'
12'0''				17748'	14790'	12677'	11093'	9860'	8814'	8067'	7395'
15'0''						15846'	13865'	12325'	11073'	10054'	9244'

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FOR 1-1/4'' COILED TUBING TABLE #2

Pull On Pipe =	2000#	4000#	6000#	8000#	10000#	12000#	14000#	16000#
3''	1178'	589'	393'	294'	236'	196'	168'	147'
6''	2356'	1178'	785'	589'	471'	393'	337'	294'
9''	3534'	1767'	1178'	884'	707'	589'	505'	442'
1'0''	4713'	2356'	1571'	1178'	943'	785'	673'	589'
1'3''	5891'	2945'	1964'	1473'	1178'	982'	892'	736'
1'6''	7069'	3770'	2356'	1885'	1414'	1178'	1010'	943'
1'9''	8247'	4123'	2749'	2062'	1649'	1375'	1178'	1031'
2'0''	9425'	4713'	3142'	2356'	1885'	1571'	1846'	1178'
2'3''	10607'	5302'	3534'	2651'	2121'	1767'	1515'	1325'
2'6''	11781'	5891'	3927'	2954'	2356'	1964'	1683'	1473'
2'9''	12959'	6480'	4320'	3240'	2592'	2160'	1851'	1620'
3'0''	14138'	7069'	4713'	3534'	2828'	2356'	2020'	1767'
3'3''	15316'	7658'	5105'	3829'	3063'	2553'	2188'	1914'
3'6''		8247'	5498'	4123'	3299'	2749'	2356'	2062'
3'9''		8836'	5891'	4418'	3534'	2945'	2525'	2209'
4'0''		9425'	6283'	4713'	3770'	3142'	2693'	2356'
4'3''		10014'	6676'	5007'	4006'	3338'	2861'	2504'
4'6''		10603'	7069'	5302'	4241'	3534'	3029'	2651'
4'9''		11192'	7461'	5596'	4447'	3731'	3198'	2798'
5'0''		11781'	7854'	5890'	4713'	3927'	3366'	2945'
5'3''		12370'	8247'	6185'	4948'	4123'		
5'6''		12959'	8640'	6480'	5184'	4320'		
5'9''		13548'	9032'	6774'	5419'	4516'	3871'	3381'
6'0''		14138'	9425'	7069'	5655'	4713'	4039'	3534'
6'3''		14727'	9818'	7363'	5891'	4909'	4208'	3682'
6'6''		15316'	10210'	7658'	6126'	5105'	4376'	3829'
6'9''			10603'	7952'	6362'	5302'	4544'	3976'
7'0''			10996'	8247'	6598'	5498'	4713'	4123'
7'3''			11089'	8541'	6833'	5694'	4991'	4270'
7'6''			11781'	8836'	7069'	5891'	5049'	4418'
7'9''			12174'	9130'	7304'	6087'	5217'	4565'
8'0''			12567'	9425'	7540'	6283'	5386'	4713'
8'3''			12959'	9720'	7776'	6480'	5554'	4860'
8'6''			13352'	10014'	8011'	6676'	5722'	5007'
8'9''			13745'	10309'	8247'	6872'	5891'	5154'
9'0''			14138'	10603'	8483'	7069'	6059'	5302'
9'3''			14530'	10898'	8718'	7265'	6227'	5449'
9'6''			14923'	11192'	8954'	7461'	6395'	5596'
9'9''			15316'	11487'	9819'	7658'	6564'	5743'
10'0''				11781'	9425'	7854'	6732'	5891'
10'3''				12076'	9661'	8051'	6900'	6038'
10'6''				12370'	9896'	8247'	7069'	6185'
10'9''				12665'	10132'	8443'	7237'	6332'
11'0''				12959'	10368'	8640'	7405'	6479'
11'3''				13264'	10603'	8836'	7574'	6627'
11'6''				13548'	10839'	9032'	7742'	6774'
11'9''				13343'	11074'	9229'	7910'	6921'
12'0''				14843'	11310'	9425'	7069'	7069'
13'0''				15316'	12253'	10210'	8752'	7658'
14'0''					13195'	10996'	9425'	8247'
15'0''					14138'	11781'	10098'	8836'

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QT-70 COILED TUBING DATA

(70 ksi Min. Yield Strength; 80 ksi Min. Ult. Strength; 20% Min Elongation)

Tube Dimensions (Inches)				Tube Area (Sq. In.)		Weight (Lb/Ft)	Load Capacity (Lbs)		Pressure Capacity (PSI)			Torque (Ft - Lbs)		Volume Capacity		External Displacement	
O.D. Nom.	Wall Nom	Wall Min.	I.D. Nom.	Wall Nom.	Inside Nom.	Nom	Yield Min.	Ultim Min.	Tested	Burst Min.	Collap. Min.	Yield Nom.	Ultim. Nom.	1,000 Ft. (Gal.)	(Bbls.)	1,000 Ft. (Gal.)	(Bbls.)
0.75	.067	.063	.616	.143	.298	0.489	10,031	10,748	9,400	12,600	10,772	132	176	15.48	0.369	22.95	0.547
1.00	.067	.063	.866	.196	.598	0.668	13,720	15,040	9,980	11,440	8,260	251	334	30.60	0.729	40.78	0.971
1.00	.075	.071	.850	.218	.568	0.741	15,260	17,440	7,860	12,900	9,970	274	365	29.51	0.703	40.78	0.971
1.00	.087	.083	.826	.250	.536	0.848	17,500	20,000	9,200	15,100	11,120	306	408	27.84	0.663	40.78	0.971
1.00	.095	.091	.810	.270	.515	0.918	18,900	21,600	10,080	16,500	12,030	326	435	26.54	0.637	40.78	0.971
1.00	.109	.104	.782	.305	.480	1.037	21,350	24,400	11,530	19,210	13,600	358	478	24.94	0.594	40.78	0.971
1.25	.067	.063	1.116	.247	.980	0.840	17,290	19,760	5,580	9,020	5,410	408	544	50.21	1.212	63.75	1.518
1.25	.075	.071	1.100	.277	.950	0.941	19,390	22,160	6,290	10,130	6,770	448	597	49.35	1.175	63.75	1.518
1.25	.087	.083	1.076	.318	.909	1.081	22,260	25,440	7,360	11,900	8,810	504	672	47.22	1.124	63.75	1.518
1.25	.095	.091	1.060	.345	.882	1.172	24,150	27,600	8,070	13,050	9,830	540	720	45.82	1.094	63.75	1.518
1.25	.109	.104	1.032	.391	.837	1.328	27,370	31,280	9,220	15,180	11,140	599	799	43.48	1.035	63.75	1.518
1.50	.095	.091	1.310	.419	1.348	1.425	29,350	33,540	6,720	10,750	7,490	808	1,078	70.03	1.667	91.806	2.186
1.50	.109	.104	1.282	.476	1.291	1.619	33,340	38,100	7,680	12,430	9,430	901	1,202	67.06	1.597	91.806	2.186
1.50	.125	.119	1.250	.540	1.227	1.836	37,800	43,200	8,790	14,390	10,690	1,001	1,334	63.74	1.518	91.806	2.186
1.50	.134	.128	1.232	.575	1.192	1.955	40,250	46,000	9,460	15,500	11,390	1,053	1,404	61.92	1.474	91.806	2.186

Test = Hydrostatic Test Pressure (80% tube Internal Pressure Rating)
Burst = Internal Burst Pressure (Nom. Tube & Min. Strength)
Collapse = External Collapse Pressure to Yield Tube (Nom. Tube & Min. Strength)
MAWD = Max Allow Work. Depth for all QT-70 = 20,590 feet.

Notes: 1. Axial Tension will increase the internal pressure rating and decrease the external collapse rating, but mud buoyancy has the opposite effect. Neither effect has been applied to the above data.
2. Above data is for new tubing at minimum strength.

* Maximum working pressure is a function of tube condition and is the responsibility of the user.

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TITAN DUMP BAILER CAPACITIES

TITAN Series No. and O.D.	Bailer Section Type	Capacity in Gallons
7110	Top (10')	.66
	10' Extension	.72
1-1/2"	5' Extension	.36
7111	Top (10')	.84
	10' Extension	.92
1-11/16"	5' Extension	.46
7120	Top (10')	1.14
	10' Extension	1.25
2"	5' Extension	.62
7130	Top (10')	2.77
	10' Extension	3.08
3"	5' Extension	1.54
7136	Top (10')	3.87
	10' Extension	4.30
3-1/2"	5' Extension	2.15
7140	Top (10')	5.16
	10' Extension	5.73
4"	5' Extension	2.86
7150	Top (10')	8.32
	10' Extension	9.24
5"	5' Extension	4.62

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WIRELINE CEMENT SIDE DUMP BAILER

CAPACITY OF BAILER PER 10' SECTION

Bailer O.D.	Gals.	Sacks
1-3/4	.92	.11
2-1/4	1.63	.20
3-	3.03	.37
3-1/2	3.82	.46
4-	5.74	.69
5-	8.50	1.03

The above capacities and following charts are based on a 16.2 lb. per gal. neat cement slurry.

To obtain a 16.2 per gal. cement slurry, mix 4-1/2 gals. of water per 94 lb. sack of cement.

A 16.2 lb. per gal. mixture yields 8.2 gals. of slurry for each sack of cement.

See page #42 for hydromite.

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DUMP BAILER FILL UP CHART

FILL UP PER 10' SECTION - ALL DIMENSIONS ARE IN LINEAR FEET

Size O.D. Inches	Wt. Per Foot	1-1/2	1-11/16	1-3/4	2''	2-1/8	2-1/4	3''	3-1/2	3-1/2 ALM.	4''	5''
2-1/2 L.P.		2.88	2.20	2.83	5.14	5.96						
3 '' L.P.		1.92	2.13	1.55	3.42	3.97	4.51					
3-1/2 L.P.		1.36	1.51	.811	2.43	2.82	3.21					
4'' L.P.		.096	1.22	1.46	1.95	2.27	2.58	4.83				
4-1/2	9.50	1.03	1.14	1.36	1.83	2.12	2.42	4.52	6.32	5.63		
4-1/2	11.60	1.07	1.19	1.42	1.91	2.22	2.52	4.72	6.60	5.88		
4-1/2	13.50	1.12	1.24	1.48	1.99	2.31	2.63	4.92	6.87	6.13		
4-1/2	15.10	1.17	1.30	1.56	2.09	2.43	2.76	5.17	7.22	6.43		
5''	11.50	.825	.916	1.10	1.47	1.71	1.94	3.64	5.08	4.53		
5''	13.00	.849	.942	1.13	1.52	1.76	1.99	3.74	5.22	4.66		
5''	15.00	.883	.980	1.17	1.58	1.83	2.08	3.89	5.43	4.84		
5''	18.00	.939	1.04	1.25	1.68	1.94	2.21	4.14	5.78	5.15		
5''	21.00	.973	1.10	1.32	1.77	2.06	2.34	4.38	6.12	5.46		
5-1/2	13.00	.674	.748	.867	1.20	1.39	1.59	2.97	4.15	3.70	5.52	
5-1/2	14.00	.683	.758	.908	1.22	1.41	1.61	3.01	4.21	3.75	5.60	
5-1/2	15.00	.694	.770	.922	1.24	1.44	1.63	3.06	4.27	3.81	5.69	
5-1/2	15.50	.701	.777	.931	1.25	1.45	1.65	3.09	4.31	3.84	5.74	
5-1/2	17.00	.717	.796	.953	1.28	1.48	1.69	3.16	4.41	3.93	5.88	
5-1/2	20.00	.752	.834	.999	1.34	1.56	1.77	3.31	4.63	4.12	6.16	
5-1/2	23.00	.787	.874	1.05	1.40	1.63	1.85	4.47	4.85	4.32	6.45	
5-3/4	14.00	.613	.681	.815	1.09	1.27	1.44	2.70	3.78	3.36	5.03	
5-3/4	17.00	.637	.707	.847	1.14	1.32	1.50	2.81	3.92	3.50	5.22	
5-3/4	19.50	.662	.735	.880	1.18	1.37	1.56	2.92	4.08	3.63	5.43	
5-3/4	22.50	.689	.765	.916	1.23	1.40	1.62	3.04	4.24	3.78	5.65	
6''	18.00	.583	.647	.775	1.04	1.21	1.37	2.57	3.59	3.20	4.78	
6-5/8	17.00	.456	.506	.606	.814	.831	1.07	2.01	2.80	2.50	3.74	
6-5/8	20.00	.469	.520	.623	.837	.952	1.10	2.07	2.89	2.57	3.84	
6-5/8	22.00	.479	.531	.636	.854	.867	1.13	2.11	2.95	2.62	3.92	
6-5/8	24.00	.490	.543	.650	.874	.884	1.15	2.16	3.01	2.69	4.01	
6-5/8	26.00	.501	.555	.665	.893	.902	1.18	2.21	3.08	2.75	4.10	
6-5/8	28.00	.512	.568	.680	.913	1.06	1.20	2.26	3.15	2.81	4.19	
6-5/8	29.00	.517	.574	.687	.923	1.07	1.22	2.28	3.19	2.84	4.24	
6-5/8	32.00	.533	.591	.708	.951	1.10	1.25	2.35	3.28	2.92	4.37	
7''	17.00	.402	.446	.534	.717	.831	.945	1.77	2.47	2.20	3.29	4.87
7''	20.00	.412	.457	.547	.735	.852	.969	1.81	2.53	2.26	3.74	4.99
7''	22.00	.419	.465	.557	.748	.867	.987	1.85	2.58	2.30	3.43	5.08
7''	23.00	.424	.470	.563	.756	.876	.997	1.87	2.61	2.32	3.47	5.18

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DUMP BAILER FILL UP CHART

FILL UP PER 10' SECTION - ALL DIMENSIONS ARE IN LINEAR FEET

Size O.D. Inches	Wt. Per Foot	1-1/2"	1-11/16"	1-3/4"	2''	2-1/8"	. 2-1/4"	3"	3-1/2"	3-1/2" ALM.	4"	5"
7''	24.00	.427	.474	.568	.763	.884	1.01	1.88	2.63	2.34	3.50	5.18
7''	26.00	.436	.484	.579	.776	.902	1.03	1.92	2.68	2.39	3.57	5.28
7''	28.00	.444	.493	.591	.793	.920	1.05	1.96	2.74	2.44	3.64	5.39
7''	29.00	.489	.498	.596	.801	.928	1.06	1.98	2.76	2.46	3.38	5.44
7''	30.00	.453	.503	.602	.808	.937	1.07	2.00	2.79	2.48	3.71	5.49
7''	32.00	.462	.513	.614	.824	.956	1.09	2.04	2.84	2.53	2.79	5.60
7''	34.00	.470	.522	.625	.839	.973	1.11	2.07	2.89	2.58	2.85	5.70
7''	35.00	.476	.528	.633	.850	.985	1.12	2.10	2.93	2.61	3.90	5.77
7''	38.00	.490	.543	.651	.874	1.01	1.15	2.16	3.01	2.69	4.01	5.93
7''	40.00	.504	.559	.669	.899	1.04	1.19	2.22	3.10	2.76	4.13	6.11
7-5/8	20.00	.338	.375	.449	.603	.699	.796	1.49	2.08	1.85	2.77	4.10
7-5/8	24.00	.348	.386	.462	.620	.719	.819	1.53	2.14	1.91	2.85	4.21
7-5/8	26.40	.353	.392	.469	.631	.731	.832	1.56	2.17	1.94	2.90	4.28
7-5/8	29.70	.363	.403	.482	.648	.751	.855	1.60	2.23	1.99	2.98	4.40
7-5/8	33.70	.375	.416	.498	.669	.764	.883	1.65	2.31	2.06	3.07	4.54
7-5/8	39.00	.391	.434	.519	.698	.824	.920	1.72	2.41	2.14	3.20	4.74
8''	26.00	.314	.349	.418	.561	.651	.741	1.39	1.94	1.73	2.58	3.81
8-1/8	28.00	.306	.340	.407	.547	.634	.721	1.35	1.89	1.68	2.51	3.71
8-1/8	32.00	.315	.349	.418	.561	.651	.741	1.39	1.94	1.73	2.58	3.81
8-1/8	35.50	.323	.359	.430	.577	.669	.761	1.42	1.99	1.77	2.65	3.92
8-1/8	39.50	.332	.369	.442	.593	.688	.782	1.46	2.05	1.82	2.73	4.03
8-5/8	24.00	.262	.290	.348	.467	.542	.616	1.15	1.61	1.44	2.14	3.17
8-5/8	28.00	.267	.296	.355	.476	.552	.628	1.18	1.64	1.46	2.19	3.23
8-5/8	32.00	.274	.304	.363	.488	.566	.644	1.21	1.68	1.50	2.24	3.31
8-5/8	36.00	.280	.311	.372	.500	.580	.660	1.23	1.72	1.54	2.30	3.40
8-5/8	38.00	.284	.315	.377	.507	.587	.668	1.25	1.75	1.56	2.33	3.44
8-5/8	40.00	.288	.319	.382	.513	.595	.677	1.27	1.77	1.58	2.36	3.48
8-5/	43.00	.293	.325	.389	.523	.607	.690	1.29	1.80	1.61	2.40	3.55
8-5/8	44.00	.295	.327	.392	.527	.611	.695	1.30	1.82	1.62	2.42	3.58
8-5/8	49.00	.304	.337	.404	.543	.629	.716	1.35	1.87	1.67	2.49	3.69
9''	34.00	.250	.277	.332	.446	.517	.588	1.10	1.54	1.37	2.05	3.03
9''	38.00	.255	.283	.339	.456	.529	.601	1.13	1.57	1.40	2.09	3.10
9''	40.00	.258	.287	.343	.461	.534	.608	1.14	1.59	1.42	3.12	3.13
9''	45.00	.266	.295	.353	.475	.550	.626	1.17	1.64	1.46	2.18	3.22
9''	55.00	.281	.312	.374	.502	.582	.662	1.24	1.73	1.54	2.30	3.41
9-5/8	29.30	.209	.232	.278	.373	.432	.492	.921	1.29	1.15	1.71	2.53
9-5/8	32.30	.211	.235	.281	.378	.438	.499	.933	1.30	1.16	1.74	2.57
9-5/8	36.00	.216	.239	.286	.385	.446	.508	.950	1.33	1.83	1.77	2.61
9-5/8	38.00	.218	.242	.289	.389	.460	.513	.960	1.34	1.19	1.78	2.64

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DUMP BAILER FILL UP CHART

FILL UP PER 10' SECTION - ALL DIMENSIONS ARE IN LINEAR FEET

Size O.D. Inches	Wt. Per Foot	1-1/2"	1-11/16"	1-3/4"	2"	2-1/8"	2-1/4"	3"	3-1/2"	3-1/2" ALM.	4"	5"
9-5/8	40.00	.220	.244	.292	.392	.455	.518	.969	1.35	1.21	1.80	2.66
9-5/8	43.50	.224	.248	.297	.399	.463	.527	.987	1.38	1.23	1.83	2.71
9-5/8	47.00	.228	.252	.303	.406	.471	.536	1.00	1.40	1.25	1.87	2.77
9-5/8	53.50	.236	.261	.313	.420	.487	.555	1.04	1.45	1.29	1.93	2.84
10''	33.00	.195	.216	.259	.348	.403	.459	.859	1.20	1.07	1.60	2.36
10-3/4	32.75	.165	.183	.219	.295	.342	.389	.728	1.02	.906	1.35	2.01
10-3/4	35.75	.167	.185	.222	.298	.346	.393	.736	1.03	.916	1.37	2.02
10-3/4	40.50	.170	.189	.226	.303	.352	.400	.749	1.05	.932	1.39	2.06
10-3/4	45.50	.173	.192	.230	.309	.359	.408	.764	1.07	.951	1.42	2.10
10-3/4	51.00	.177	.196	.235	.316	.366	.416	.780	1.09	.970	1.45	2.14
10-3/4	54.00	.179	.199	.238	.320	.371	.422	.790	1.10	.983	1.47	2.17
10-3/4	55.50	.180	.200	.239	.322	.373	.424	.794	1.11	.988	1.48	2.18
10-3/4	60.70	.184	.204	.244	.328	.380	.433	.810	1.13	1.01	1.51	2.23
10-3/4	65.70	.188	.208	.249	.335	.389	.442	.827	1.16	1.03	1.54	2.28
11-3/4	38.00	.138	.153	.183	.246	.286	.325	.608	.850	.757	1.13	1.67
11-3/4	42.00	.140	.155	.186	.249	.289	.329	.616	.860	.766	1.14	1.69
11-3/4	47.00	.142	.157	.188	.253	.293	.334	.625	.873	.778	1.16	1.72
11-3/4	54.00	.145	.161	.193	.259	.300	.341	.639	.892	.795	1.19	1.76
11-3/4	60.00	.148	.164	.196	.264	.306	.348	.652	.910	.811	1.21	1.79
12''	40.00	.132	.147	.175	.236	.274	.312	.584	.815	.726	1.09	1.60
13''	40.00	.111	.123	.147	.198	.230	.261	.489	.683	.608	.909	1.34
13''	45.00	.112	.125	.149	.200	.232	.264	.495	.691	.616	.921	1.36
13''	50.00	.114	.126	.151	.203	.235	.268	.501	.700	.624	.932	1.38
13''	54.00	.115	.128	.153	.205	.238	.271	.506	.707	.630	.942	1.39
13-3/8	48.00	.106	.118	.141	.189	.220	.250	.468	.653	.582	.870	1.29
13-3/8	54.40	.108	.120	.143	.192	.223	.254	.475	.664	.591	.884	1.31
13-3/8	61.00	.110	.122	.146	.196	.227	.258	.483	.674	.601	.898	1.33
13-3/8	68.00	.111	.124	.148	.199	.230	.262	.491	.685	.611	.912	1.35
13-3/8	72.00	.113	.125	.150	.201	.233	.265	.496	.693	.617	.922	1.36
13-3/8	83.00	.116	.128	.154	.207	.240	.273	.510	.713	.635	.949	1.40
14''	50.00	.096	.107	.128	.192	.199	.227	.425	.593	.629	.790	1.17
16''	55.00	.073	.081	.096	.130	.150	.171	.320	.447	.398	.595	.879
16''	65.00	.074	.082	.098	.132	.153	.174	.325	.454	.405	.605	.894
16''	70.00	.074	.082	.099	.133	.154	.175	.327	.457	.408	.609	.900
16''	75.00	.075	.083	.010	.134	.155	.177	.331	.462	.412	.615	.909
16''	84.00	.076	.085	.101	.136	.158	.179	.336	.469	.417	.624	.923
20''	94.00	.047	.052	.063	.084	.097	.110	.207	.289	.257	.385	.569

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HYDROMITE

FIELD PROCEDURE FOR HYDROMITE

This can be summarized briefly into the following steps:

1. Study the well and plan the job.
2. Preparation and cleaning of the well. Be sure the well is dead.
3. Obtain accurate bottom-hole temperature.
4. Place correct amount of water in the mixer. (At the rate of 3 gals per 100 lbs. Hydromite).
5. Refer to Table No. I or II for type and amount of catalyst to be used, corresponding to the indicated bottom-hole temperature.
6. Add catalyst in mixing water and circulate at least one minute.
7. Add Hydromite and mix thoroughly until the slurry is smooth.
8. Pour into bailer and lower bailer in well.
9. Apply squeeze pressure to the Hydromite (100 psi minimum).

PHYSICAL PROPERTIES

Some of the physical properties of Hydormite (mixed with 3 gallons of water per 100 pounds) are:

1. Slurry volume per 100 lbs. Hydromite - 8.4 gals.
2. Slurry weight - 14.9 lbs/gal (111.5 lbs/cu ft.)
3. Compressive strength - 4000 psi or more in 24 hours
4. Expansion - 0.3% at initial set.

Set Hydromite is a hard impermeable material, which expands as it takes its initial set.

This property assists in giving the plug a tight bond to the formation.

Hydromite is composed of two phases: First a gypsum phase, and second, a resin-water phase. When pressure is applied to Hydromite or it is "squeezed," the resin-water phase is forced into the permeable formation where it sets up into a hard impermeable mass.

SETTING TIME

The setting or hardening of Hydromite proceeds in two stages, both of which depend upon temperature and the amount of catalyst used. The gypsum cement portion of the Hydromite usually hardens or "sets" before the resin portion reaches its final hardening point. While Hydromite will take its initial set in about 90 minutes or less after mixing, the material may not reach final hardness for a number of hours due to the gradual hardening of the resin portion of the mix.

The effect of the catalyst upon the gypsum portion of Hydromite is small, and the primary use of the catalyst is to help control the setting time of the resin portion. Thus an error in the amount of catalyst used may not be too noticeable in the surface sample, or in the hardness of the plug in the well, but will change the setting time of the resin portion to such and extent as to prevent either squeezing it into the formation, or its setting up after it has been squeezed into the formation.

Two types of catalyst are used depending upon the bottom-hole temperature of the well. Table No. I gives the amount of Catalyst A to use when B.H.T. is from 60 to 120°F, and Table No. II gives the amount of Catalyst A 120 to use when B.H.T. is from 120 - 180°F. These tables also give the time available for dumping Hydromite, initial hardening time, and the final hardening time.

In cases where a plug of Hydromite is placed and it is desired to dump more material on top of this plug, the setting time to be considered is that shown in the column headed "Initial Hardening Time." For example, with a B.H.T. of 160°F and addition of 4 oz. of Catalyst A-120 per 100 pounds, the plug would be hard enough to dump on in approximately 95 minutes after mixing, even though maximum hardness would not be reached for 5 to 6 hours.

In cases where the resin phase is squeezed out into the formation and the plug is to be drilled out, the time to be considered will be found in the column headed "Final Hardening Time." For example, at a BHT of 160°F, when using 4 oz of catalyst per 100 pounds, the plug should not be drilled out for at least 5 hours. This is the time required for the resin portion of the Hydromite to cure or "set." Never swab, bail or drill the well until the time given in the column "Final

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Hardening Time" has elapsed.

MIXING

Hydromite is mixed by using 3 gallons of water per 100 pounds of Hydromite. Do not use excess water.

The mixing water should be clean and fresh. Never use salt water for mixing Hydromite.

The temperature of the mixing water should never exceed the bottom-hole temperature of the well and should preferably not exceed 85°F. The use of cold water in mixing Hydromite will give a thickening of the slurry which makes it appear that insufficient mixing water has been used. This thickening of the slurry may be expected whenever the temperature of the slurry is below 40°F.

During cold weather it is advisable to preheat the mixing water sufficiently to balance the cooling effect of the cold mixer, bailer and Hydromite.

Hydromite may be mixed in either the standard CalSeal mixer, or in a small container with a portable mixer. The catalyst is added to the mixing water and mixed thoroughly. The Hydromite is then added and mixed until the slurry is smooth, free of lumps, and at the proper consistency.

PLACING IN WELL

Hydromite is usually placed in a well by using the Halliburton dump bailer equipment. The dump bailer, filled with fresh water, is run to bottom of hole and dumped, to help assure that the bailer will go freely to bottom and to flag the bailer line. After the Hydromite is mixed, it is poured into the bailer and run to bottom. The bailer should be set on bottom only once, with sufficient force to shear the bailer disc. It is then picked up about a foot, held for a minute, picked up to the calculated height of the dump, held for a minute and then brought up out of the hole. Any unnecessary fluid agitation by the bailer, while on bottom, will increase the chances of contamination of the Hydromite.

A squeeze pressure of not less than 100 psi should be applied immediately to the Hydromite in the well. High squeeze pressures will not damage Hydromite, so the 100 psi is the minimum to use. The maximum may be any pressure desired. In general squeeze pressures from 800 to 1,000 psi (5500-6900 kPa) are preferred.

If the well is full of fluid, this squeeze pressure should be applied with a pressure pump. It the fluid level is low, quickly loading the hole with fluid should give the necessary pressure head. Remember that this pressure should be applied before the "Initial Hardening Time" has elapsed.

When loading the hole, 100 psi (690 kPa) will require an increase in the fluid level of the well of about 250 feet (76 m) when using water or about 350 feet (107 m) using oil.

It is advisable to catch a sample of the Hydromite slurry as it is dumped into the bailers. This sample gives an indication as to when the material in the well is set.

It is not advisable to pump Hydromite through tubing. If it is necessary to do so, contact the Halliburton Chemical Research and Development Laboratory for advice as to the proper retarders and procedures.

THE USE OF HYDROMITE IN DEEP WELLS

Hydromite has been used successfully in the field at well depths of approximately 12,000 feet (3660 m) where bottom-hole temperatures are on the order of 200 to 225°F (93 to 107°C). Under these conditions, no catalyst is used and 30 grams of sodate retarder per 50 pounds (27 kg) of hydromite is recommended. The dumping time under these conditions is approximately one hour. Laboratory tests with percentages of sodate retarder in excess of the amount shown above do not extend the dumping time. In deep wells a trial run to the bottom of the hole with fresh water is suggested to determine if the material can be dumped in the alloted time.

The secret to a successful operation is to dump the material as quickly as possible. At these temperatures, Hydromite should set hard in approximately five hours.

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TABLE I: 60 TO 120°F (16 TO 49°C)
CATALYST A PER 100 LBS. (45.4 KG) HYDROMITE

Bottom-Hole Temperature °F (°C)	Catalyst A Per 100 Lbs.		Available Pumping Time Minutes	Initial Hardening Time Minutes	Final Hardening Time Hours	Setting Time at 75 °F (24 °C) Minute
	Oz *	G				
60 (16)	24	680	30	100	20	60
65 (18)	21	595	30	95	16	60
70 (21)	18	510	30	90	10	70
75 (24)	15	425	30	85	8	70
80 (27)	12	340	30	85	7	75
85 (29)	9	255	30	75	6	75
90 (32)	6-1/2	184	30	75	5	80
95 (35)	5	142	30	70	4	80
100 (38)	4	113	30	65	4	80
105 (41)	3-1/2	99	30	65	4	80
110 (43)	3	85	30	60	3	80
115 (46)	2-3/4	78	30	60	3	80
120 (49)	2-1/2	71	30	60	3	80

*Note: It is permissible to use either volume or weight measurements for the amount of catalyst required.

Special Cements Hydromite
TABLE II: 120 TO 180°F (49 TO 82°C)
CATALYST A-120 PER 100 LBS. (45.4 KG.) HYDROMITE

Bottom-Hole Temperature °F °C	Catalyst A-120 Per 100 Lbs.		Available Pumping Time Minutes	Initial Hardening Time Minutes	Final Hardening Time Hours	Setting Time At 75 °F (24 °C) Minutes
	Oz *	G				
120 (49)	20	567	30	60	3	85
125 (52)	16	454	30	60	3	85
130 (54)	12	340	30	70	4	85
135 (57)	10	283	30	80	4	90
140 (60)	8	227	30	80	4	90
145 (63)	7	198	30	90	4	90
150 (66)	6	170	30	90	4	90
155 (68)	5	142	30	90	4	90
160 (71)	4	113	30	95	5	90
165 (74)	3	85	30	95	5	90
170 (77)	2	57	30	95	5	90
175 (79)	1-1/2	43	30	100	5	90
180 (82)	1	28	30	110	5	90

* It is permissible to use either volume or weight measurements for the amount of catalyst required.

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SECTION 9

JUNK CATCHERS

	Page
Weatherford Homco™ Type "P" Junk Subs	1 - 2
Weatherford Homco™ Type "H" Junk Baskets	3 - 4
Bowen Reverse Circulating Junk Baskets	5 - 6
Bowen Itco Type Junk Basket	7 - 8
Bowen & K.&G. Magnets	9 - 10

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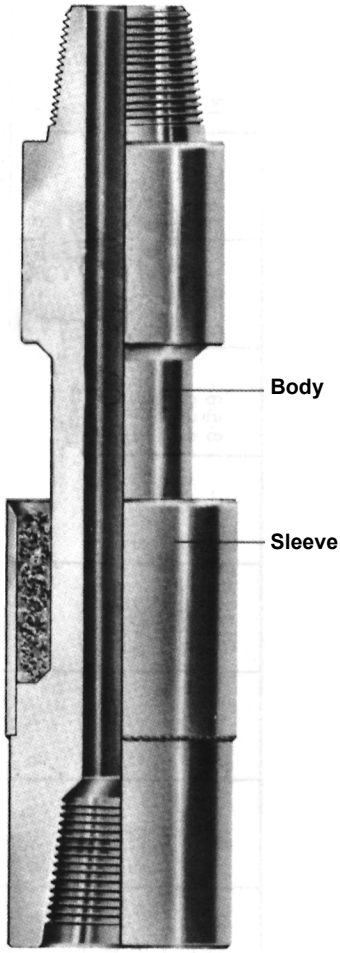
WEATHERFORD HOMCO ™ TYPE P JUNK BASKET (Bit Basket)

The HOMCO Type P Junk Basket will catch small foreign objects as they are circulated up from the bottom of the hole when drilling, milling or in junk fishing operations. The annulus above the basket's sleeve abruptly increases. This causes a drop of velocity decreasing the carrying capacity of the fluid. With the fluid slowed, the heavier junk drops into the trap formed by the junk basket sleeve.

The body is normally furnished with API regular tool joint connections, box down and pin up, so that it may be run directly above bit or mill.

The sleeve is scientifically welded to the body without introducing resideual stresses and in inspected by magnetic particle method.

On special request, HOMCO Type P Junk Baskets can be furnished with a left-handed thread on the lower end of the body attaching the body to the sleeve, permitting the use of alternate sleeve sizes.



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HOMCO TYPE P JUNK BASKET (BIT BASKET)

Specifications

Recommended Hole Size (in.)	4-1/8 4-1/2	4-5/8 - 4-7/8	5 - 5-3/4	5-7/8 - 6-3/8	6-1/2 - 7-3/8	7-1/2 - 8-1/2	8-5/8 - 9-5/8	9-5/8 - 11-3/8	11-1/2 - 13	14 - 17-1/2
Connection	2-3/8 API Reg.	2-7/8 API Reg.	2-7/8 API Reg.	3-1/2 API Reg.	3-1/2 API Reg.	4-1/2 API Reg.	4-1/2 API Reg	6-5/8 API Reg.	6-5/8 API Reg.	7-5/8 API Reg.
Max. Body O.D. (in.)	3-1/8	4	4	5	5	6-1/2	6-1/2	8-1/2	8-1/2	9
Min. Body O.D. (in.)	2	2-1/2	2-1/2	3-1/4	3-1/4	4-1/4	4-1/4	5-1/2	5-1/2	7-1/2
Sleeve O.D. (in.)	3-11/16	4	4-1/2	5	5-1/2	6-5/8	7	8-1/2	9-5/8	12-3/4
Sleeve I.D. (in.)	3-1/8	3-21/32	3-7/8	4-9/16	4-7/8	6-1/8	6-1/4	7-7/8	8-3/8	11-1/2
Sleeve Length (in.)*	10-1/2	10-1/2	10-1/2	10-1/2	10-1/2	10-1/2	10-1/2	10-1/2	10-1/2	17
Bore (in.)	1	1	1	1-1/2	1-1/2	2	2	3	3	2-13/16

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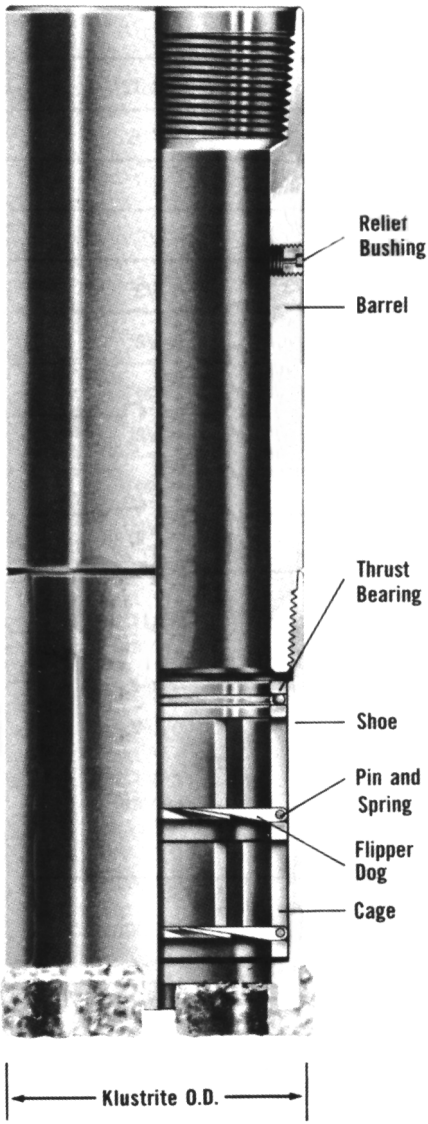
WEATHERFORD HOMCO™ TYPE "H" JUNK BASKET



Double Catcher
Type H Junk Basket

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WEATHERFORD HOMCO™ TYPE "H" JUNK BASKET

Barrel O.D.	I.D.	Connection on Barrel
3-7/8"	2-23/32"	3-3/4 FJ
4-1/4"	3-1/16"	Special
5-5/8"	4"	5-1/2" 17# Hydril
5-7/8"	4"	5-1/2" 17# Hydril
6-1/4"	4-5/8"	5-1/2" 17# Hydril
7-1/2"	5-5/8"	7" X-Line
8-3/8"	6-1/4"	7-5/8" X-Line
9-1/8"	7-1/4"	7-5/8" X-Line
11-1/4"	9"	6-5/8" Reg.
16"	12-1/8"	6-5/8" Reg.

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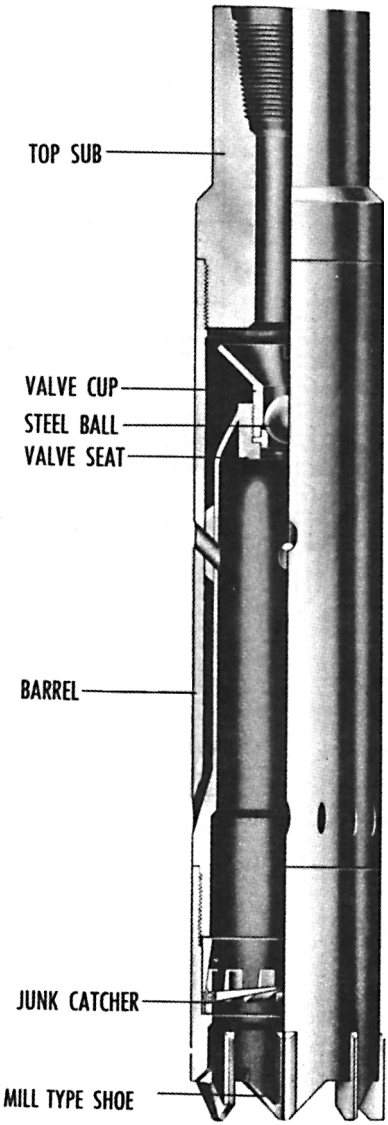
BOWEN
REVERSE CIRCULATION
JUNK BASKETS
(Patented)



BOWEN JUNK BASKET

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BOWEN REVERSE CIRCULATION JUNK BASKETS

Hole Size	3-3/4 - 4	4-1/8 - 4-1/2	4-5/8 - 5	5-1/8 - 5-1/2	5-5/8 - 6	6-1/8 - 6-1/2	6-5/8 - 7-3/8	7-1/2 - 8-1/4	8-3/8 - 9-1/2	9-5/8 - 10-5/8	10-3/4 11-5/8	11-3/4- 12-1/2	12-5/8- 13-5/8	13-3/4 16	16 - 17-1/2
O.D. Of Barrel	3-5/8	4	4-1/2	4-7/8	5-1/8	5-3/4	6-1/4	7	7-7/8	9-1/8	10-1/8	11	11-7/8	13	15
Max. Diameter Of Fish	2-1/4	2-1/2	3-1/16	3-9/16	3-3/4	4-3/8	4-3/4	5-1/8	6-1/16	7-1/16	7-5/8	8-5/16	8-1/2	9-13/16	11
Top Connection	2-3/8	2-3/8	2-7/8	2-7/8	3-1/2	3-1/2	4-1/2	4-1/2	5-1/2	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8
Number Of Teeth On Mill	6	6	8	8	8	8	8	8	8	10	10	12	12	14	16
Comp. Assem. Part No.	6635	7295	4448	4572	2618	51670	2677	2554	2567	2659	2684	2690	2696	2702	2708
Weight	85	98	108	128	142	185	238	293	374	441	576	665	797	932	1563
Steel Ball Part No.	6640	6640	4453	4453	2623	2623	2623	2572	2572	2665	2665	2665	2665	2665	2665
Diameter	15/16	15/16	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	1-11/16	1-11/16	2-1/4	2-1/4	2-1/4	2-1/4	2-1/4	2-1/4
Weight	3/16	3/16	1/4	1/4	1/2	1/2	1/2	3/4	3/4	2	2	2	2	2	2

BOWEN REVERSE CIRCULATION JUNK BASKETS (W7R TYPE)

Hole Size	3-3/4 - 4-1/8	4-1/4 - 4-1/2	4-5/8 - 5	5-1/8 - 5-1/2	5-5/8 - 6	6-1/8 - 7	7-1/8 - 7-1/2	7-5/8 - 8-1/2	8-5/8 - 9-1/2	9-5/8 - 10-3/8	10-1/2 - 11-5/8	11-3/4 - 13-3/8	13-1/2 - 15
O.D. Of Barrel	3-5/8	4-1/8	4-1/2	4-7/8	5-3/8	5-7/8	6-3/4	7-5/16	8-3/16	9-1/8	9-7/8	11	12-3/4
Maximum Diameter Of Fish	2-3/4	3	3-3/8	3-5/8	4-1/16	4-5/8	5-1/4	5-5/8	6-1/2	7-1/8	7-3/4	8-5/8	9-15/16
Top Connection	2-3/8	2-3/8	2-3/8	2-7/8	2-7/8	3-1/2	3-1/2	4-1/2	4-1/2	5-1/2	5-1/2	6-5/8	6-5/8
Number Of Teeth On Mill	6	6	8	8	8	8	8	8	10	10	10	12	14
Comp. Assem. Part No.	7724	7727	7731	7734	7737	7743	7747	7751	7754	7757	7760	7764	7767
Weight	78	85	95	108	141	173	223	280	380	407	484	597	794
Steel Ball Part No.	6640	6640	6640	4453	4453	2623	2623	2572	2572	2665	2665	2665	2665
Weight	3/16	3/16	3/16	1/4	1/4	1/2	1/2	3/4	3/4	2	2	2	2
Diameter	15/16	15/16	15/16	1-1/8	1-1/8	1-3/8	1-3/8	1-11/16	1-11/16	2-1/4	2-1/4	2-1/4	2-1/4

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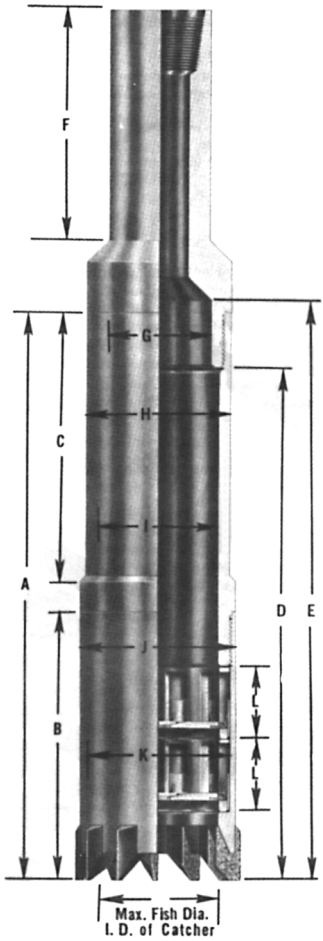
ITCO TYPE
BOWEN JUNK BASKETS
(Patented)



ASSEMBLY	SHOE O.D.	MAXFISH O.D.	BARREL CONN.
#14590	3-5/8" O.D.	2-23/32" O.D.	2-3/8" Reg. Pin
#14595	4-1/2" O.D.	3-9/32" O.D.	2-7/8" Reg. Pin
#14610	5-7/8" O.D.	4-5/16" O.D.	3-1/2" Reg. Pin
#14620	7-1/8" O.D.	5-7/16" O.D.	4-1/2" Reg. Pin
#14625	8-1/8" O.D.	6-3/16" O.D.	4-1/2" Reg. Pin
#14640	11-1/4" O.D.	9-1/16" O.D.	6-5/8" Reg. Pin

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PRINCIPAL DIMENSIONS
BOWEN JUNK BASKET - ITCO TYPE

Junk Basket #	Hole Size	Standard O.D. of Hardface Shoe	Max. Fish Dia.	A	B	C	D	E	F	G	H	I	J	K	L
14590	3-3/4 to 4-1/8	3-5/8 - 4-1/8	2-23/32	26-1/4	8-1/4	*	23	26-5/8	+	1-7/8	3-5/8	2-23/32	3-5/8	2-9/32	1-7/8
14586	4-1/4 to 4-1/2	4-1/16 - 4-1/2	2-31/32	26-3/8	8-3/8	15-27/32	23-1/8	26-3/4	+	2-1/8	3-1/4	2-31/32	4-1/16	3-23/32	2-5/16
14595	4-5/8 to 5	4-1/2 - 5	3-9/32	27-1/8	9-1/8	15-11/16	23-7/8	27-1/2	+	2-3/8	3-7/8	3-9/32	4-1/2	4-1/16	2-3/8
19375	4-5/8 to 5	4-1/2 - 5	3-3/8	27	9	15-11/16	23-3/4	27-5/8	13	2-3/8	3-7/8	3-13/32	4-1/2	4-7/64	2-7/16
14600	5-1/8 to 5-1/2	4-7/8 - 5-1/2	3-9/32	26-15/16	8-15/16	15-11/16	23-15/16	27-9/16	+	2-3/4	4-1/4	3-23/32	4-7/8	4-17/32	2-5/8
2618	5-5/8 to 6	5-1/8 - 5-3/4	3-25/32	29-7/8	11-7/8	*	26-5/8	30-5/8	+	3-3/4	5-1/8	3-25/32	5-1/8	4-1/2	2-5/8
14605	5-5/8 to 6	5-3/8 - 6	4-1/16	29-3/16	11-13/16	15-47/64	25-15/16	29-11/16	+	3	4-3/4	4-1/16	5-3/8	4-15/16	2-25/32
2670	6-1/8 to 6-1/2	5-3/4 - 6-1/2	4-3/8	30-1/4	11-15/16	*	47-1/4	31-1/4	+	4	5-3/4	4-13/32	5-3/4	5-5/32	2-13/16
14610	6-1/8 to 6-5/8	5-7/8 - 6-5/8	4-5/16	30-11/16	12-11/16	15-5/8	27-7/16	31	+	3-5/16	5-1/8	4-5/16	5-7/8	5-3/8	2-7/8
19379	6 to 6-3/8	5-7/8 - 6-3/8	4-1/2	30-11/16	12-11/16	15-5/8	27-7/16	28	13	3-1/2	5-1/8	4-7/32	5-7/8	5-15/32	2-7/8
14615	6-3/4 to 7-1/4	6-1/4 - 7-1/4	4-3/16	31-1/4	13-1/4	15-3/4	28	32-1/4	+	3-1/2	5-3/4	4-13/16	6-1/4	5-3/4	3-1/16
14620	7-3/8 to 8-1/4	7-1/8 - 8-1/4	5-7/16	31-3/4	13-3/4	15-11/16	28-1/2	31-3/4	+	4-5/8	6-1/2	5-7/16	7-1/8	6-7/16	3-5/16
14625	8-3/8 to 9-1/4	8-1/8 - 9-1/4	6-3/16	33-1/4	15-1/4	15-11/16	29-1/2	33-1/2	+	5-1/8	7-1/2	6-3/16	8-1/8	7-3/16	3-13/16
14630	9-3/8 to 10-1/4	9-1/8 - 10-1/4	7-3/16	34-1/4	16-1/4	15-11/16	30-5/8	34-5/8	+	6-1/8	8-1/2	7-3/16	9-1/8	8-3/16	4-5/16
14635	10-3/8 to 11-7/8	10-1/8 - 11-7/8	8-1/16	35-7/8	17-7/8	15-5/8	32-1/8	37-1/8	+	6-1/2	9-3/8	8-1/16	10-1/8	9-3/8	5
14640	11-3/4 to 14-1/4	11-1/4 - 14-1/4	9-1/16	37-5/16	19-1/16	15-13/16	33-5/16	38-5/16	+	7-1/4	10-3/8	9-1/16	11-1/4	10-7/16	5-3/16
14645	12-5/8 to 15	12-1/4 - 15	10-1/16	44-5/8	22-5/8	19-9/16	40-3/8	50-1/8	+	7-1/2	11-3/8	10-1/16	12-1/4	11-3/8	6
14650	14-3/4 to 18	14-1/2 - 18	12-1/16	50-3/4	26-3/4	21	46	52-1/4	+	9-1/4	13-3/4	12-1/16	14-1/2	13-5/8	7

*Flush from SHOE to SUB
+Length to order, specify box or pin connection.

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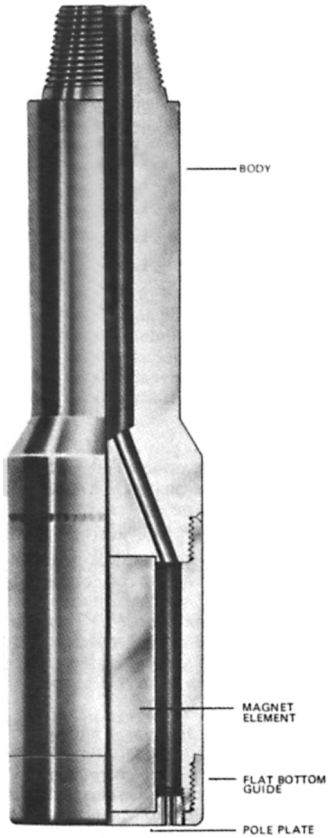
MAGNETS

BOWEN & K&G

HOLE SIZE (IN.)	MAGNET O.D. (IN.)	COMMON CONNECTION
1-1/4 - 2	1	5/8 11-NC
1-5/8 - 2-1/2	1-1/4	5/8 SR Pin
1-3/4 - 2-5/8	1-3/8	5/8 SR Pin
2 - 2-3/4	1-1/2	5/8 SR Pin
2-3/8 - 3-1/4	1-3/4	3/4 SR Pin
2-3/4 - 3-/58	2-1/4	3/4 SR Pin
3 - 3-3/4	2-1/2	3/4 SR Pin
3-1/4 - 4-1/8	3	2-3/8 EUE Pin
4 - 4-1/4	3-1/4	2-3/8 EUE or Reg Pin
4-1/4 - 4-1/2	3-1/2	2-3/8 Reg Pin
4-1/2 - 5	4	2-3/8 Reg Pin
5-1/8 - 5-1/2	4-1/2	2-7/8 Reg Pin
5-5/8 - 6	5	2-7/8 Reg Pin
6-1/8 - 6-1/2	5-1/2	3-1/2 Reg Pin
6-1/8 - 6-1/2	5-3/4	3-1/2 Reg Pin
6-5/8 - 7-1/2	6	3-1/2 Reg Pin
6-7/8 - 7-3/4	6-3/8	3-1/2 Reg Pin
7-5/8 - 8-1/2	7	4-1/2 Reg Pin
7-5/8 - 8-5/8	7-1/4	4-1/2 Reg Pin
8-5/8 - 9-3/4	8	4-1/2 Reg Pin
8-3/4 - 10	8-1/4	4-1/2 Reg Pin
9-7/8 - 11-5/8	9	4-1/2 Reg Pin
10-1/2 - 11-7/8	10	6-5/8 Reg Pin
11-3/4 - 13	10-1/2	6-5/8 Reg Pin
12-1/4 - 14	11-1/2	6-5/8 Reg Pin
15	14	6-5/8, 7-5/8 Reg Pin
17- 17-1/2	16	6-5/8, 7-5/8 Reg Pin
20	19	7-5/8 Reg Pin or 13-3/8 Reed V4 THD.



BOWEN FISHING MAGNET

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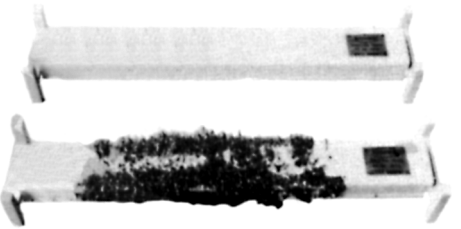
BOWEN DITCH MAGNET

The Bowen Ditch Magnet is the best available and most effective means of trapping and removing metal particles from the drilling mud that the shale shaker will not get. This unit will capture all metals having magnetic attraction and hold them until they can be removed from the mud stream. The Magnet is particularly valuable during milling operations. Removal of mill cuttings and debris reduces wear of mud pumps and other equipment, as well as eliminating problems caused by the return downhole of harmful debris. They are equally effective during washover and fishing jobs.

The Bowen Ditch Magnet features simplicity, ruggedness and high power-to-weight ratio. The three foot long Magnet weighs only 90 pounds and will hold in suspension as much as half this weight of mill cuttings. The design is clean; eliminating trays, gates and other auxiliary equipment. The magnet is encased in a thin, tough noncorrosive plastic. The Magnet has an integral eye at each end for lifting.



No special instructions are required to operate the Bowen Ditch Magnet. It is most effective when suspended by soft line in the mud ditch. It may also be suspended by soft line in the shaker discharge. The unit should be cleaned several times per day, depending on milling rate. Just remove the Magnet and clean with fresh or salt water hose. Wipe all cuttings from the unit and return it to duty. The unit may be cleaned less often during other operations when return cuttings come slower.

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SECTION 10

OVERSHOTS

		Page
Bowen Series	# 10	1-3
	# 20	4-5
	# 70	6-7
	#150	8-14
	#160	15-16
McCullough		17-21

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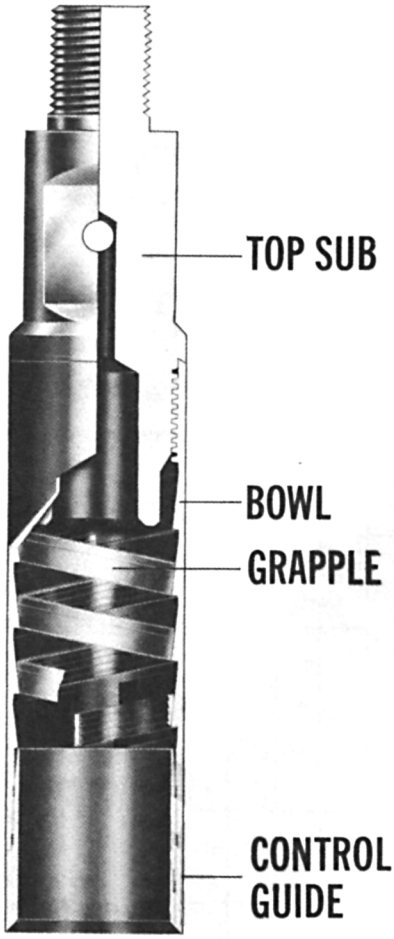
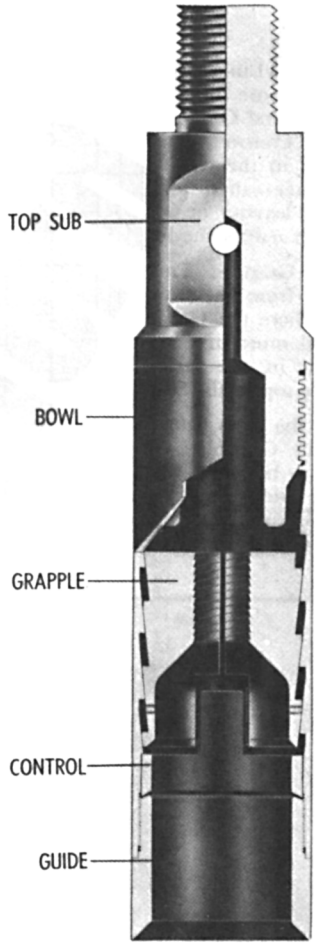
BOWEN SUCKER ROD OVERSHOTS
SERIES 10



SERIES 10 OVERSHOT
WITH SPIRAL GRAPPLE



SERIES 10 OVERSHOT
WITH BASKET GRAPPLE

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DATA-BOWEN SUCKER ROD OVERSHOT
SERIES 10

Grapple Number	Maximum Catch				Overshot O.D.	Standard Box Connection	Type	Assembly Part Number	Load Capacity At Yield Point		
	Spiral		Basket						Spiral Grapple	Basket Grapple	
										Catch Size	W-o/Stop
	In.	mm	In.	mm	In.				Lbs.	In.	Lbs.
9793	1-1/16	**27.0**	7/8	**22.2**	1-9/16	3/4 Rod	FS	9790	–	7/8 Down	–
17988	1-1/4	**31.7**	1-1/16	**27.0**	1.43	3/4 Rod	SH	17985	16,500	1-1/16 Down	11,500
16493	1-3/8	**34.9**	1-3/16	**30.2**	1-21/32	3/4 Rod	SH	16490	39,100	1-3/16 - 1'' Excl. 1'' Down	28,500 18,000
26498	1-3/8	**34.9**	1-3/16	**30.2**	1-21/32	3/4 Rod LH	SH	26495**	39,100	1-3/16 - 1'' Excl. 1'' Down	28,500 18,000
13943	1-1/2	**38.1**	1-5/16	**33.3**	1-25/32	3/4 Rod	SH	13940	39,500	1-5/16 - 1'' Excl. 1'' Down	28,500 18,000
9992	1-1/2	**38.1**	1-5/16	**33.3**	1-29/32	3/4 Rod	SH	9990	83,800	1-5/16 Down	38,200
9343	1-5/8	**41.3**	1-7/16	**36.5**	1-29/32	3/4 Rod	SH	9340	39,500	1-7/16 - 1'' Excl. 1'' Down	28,500 18,000
9343	1-5/8	**41.3**	1-7/16	**36.5**	1-29/32	3/4 Rod LH	SH	17040*	39,500	1-7/16 - 1'' Excl. 1'' Down	28,500 18,000
9343	1-5/8	**41.3**	1-7/16	**36.5**	1-29/32	3/4 Rod LH	SH	19265*	39,500	1-7/16 - 1'' Excl. 1'' Down	28,500 18,000
21627	1-5/8	**41.3**	1-7/16	**36.5**	1-29/32	3/4 Rod LH	SH	21625**	39,500	1-7/16 - 1'' Excl. 1'' Down	28,500 18,000
9343	1-5/8	**41.3**	1-7/16	**36.5**	2-5/16	7/8 Rod	FS	9880	138,100	1-7/16 - 1'' Excl. 1'' Down	93,900 59,400
9343	1-5/8	**41.3**	1-7/16	**36.5**	2-5/16	7/8 Rod LH	FS	17045*	138,100	1-7/16 - 1'' Excl. 1'' Down	93,900 59,400
9343	1-5/8	**41.3**	1-7/16	**36.5**	2-5/16	7/8 Rod LH	FS	19270*	138,100	1-7/16 - 1'' Excl 1'' Down	93,900 59,400

Special Notes:

(1) Grapples available in 1/16'' intervals

* Left-Handed Threads

** This is a Left-Hand Tool

† Spiral Control

F.S. (Full Strength) Engineered to withstand all pulling, jarring and torsional strain

S.F.S. (Semi Full Strength) Engineered to withstand all pulling strain

S.H. (Slim Hole) Engineered to withstand heavy pulling strain only.

(Cont. on pg. 10-3)

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DATA-BOWEN SUCKER ROD OVERSHOT
SERIES 10

(Cont. from pg. 10-2)

Grapple Number	Maximum Catch				Overshot O.D.	Standard Box Connection	Type	Assembly Part Number	Load Capacity At Yield Point		
	Spiral		Basket						Spiral Grapple	Basket Grapple	
										Catch Size	W-o/Stop
	In.	mm	In.	mm	In.				Lbs.	In.	Lbs.
27768	1-13/16	**46.0**	1-5/8	**41.3**	2-1/8	7/8 Rod	SH	27765	55,700	1-3/4 - 7/8 Excl. 1-1/8 Down	40,100 25,400
11483	1-13/16	**46.0**	1-5/8	**41.3**	2-5/16	7/8 Rod	SFS	11480	118,100	1-9/16 - 1-1/8 Excl 1-1/8 Down	85,100 53,800
11483	1-13/16	**46.0**	1-5/8	**41.3**	2-5/16	7/8 Rod LH	FS	30308*	118,100	1-9/16 - 1-1/8 Excl 1-1/8 Down	85,100 53,800
16073	1-15/16	**49.2**	1-3/4	**44.4**	2-1/4	7/8 Rod	SH	16070	55,700	1-3/4 - 1-3/16 Excl. 1-3/16 Down	40,100 25,400
21633	1-15/16	**49.2**	1-3/4	**44.4**	2-5/16	7/8 Rod LH	SH	21630**	68,100	1-11/16 - 1-1/8 Excl. 1-1/8 Down	49,000 31,000
9403	2	**50.8**	1-13/16	**46.0**	2-5/16	7/8 Rod	SH	9400	55,700	1-3/4 - 1-1/16 Excl. 1-1/8 Down	40,100 25,400
9403	2	**50.8**	1-13/16	**46.0**	2-5/16	7/8 Rod LH	SH	16985*	55,700	1-13/16 - 1-1/16 Excl. 1-1/8 Down	40,100 25,400
9403	2	**50.8**	1-13/16	**46.0**	2-5/16	7/8 Rod LH	SH	19280*	55,700	1-13/16 - 1-1/16 Excl. 1-1/16 - 1 Excl.	40,100 25,400
34494	2	**50.8**	1-13/16	**46.0**	2-5/16	7/8 Rod LH	SH	34492**	55,700	1-3/4 - 1-1/16 Excl. 1-1/8 Down	40,100 25,400
9403	2	**50.8**	1-13/16	**46.0**	2-7/8	7/8 Rod	FS	9530	200,400	1-15/32 - 1-1/16 Excl. 1-1/8 Down	144,400 91,300
9403	2	**50.8**	1-13/16	**46.0**	2-7/8	7/8 Rod LH	FS	17130*	200,400	1-15/32 - 1-1/16 Excl. 1-1/8 Down	144,400 91,300
9872	2-3/8	**60.3**	2-3/16	**55.6**	2-27/32	7/8 Rod	SH	15860	70,000	2-1/8 - 1-1/8 Excl. 1-1/8 Down	51,100 37,700

Special Notes:

(1) Grapples available in 1/16'' intervals

* Left-Handed Threads

** This is a Left-Hand Tool

† Spiral Control

F.S. (Full Strength) Engineered to withstand all pulling, jarring and torsional strain

S.F.S. (Semi Full Strength) Engineered to withstand all pulling strain

S.H. (Slim Hole) Engineered to withstand heavy pulling strain only.

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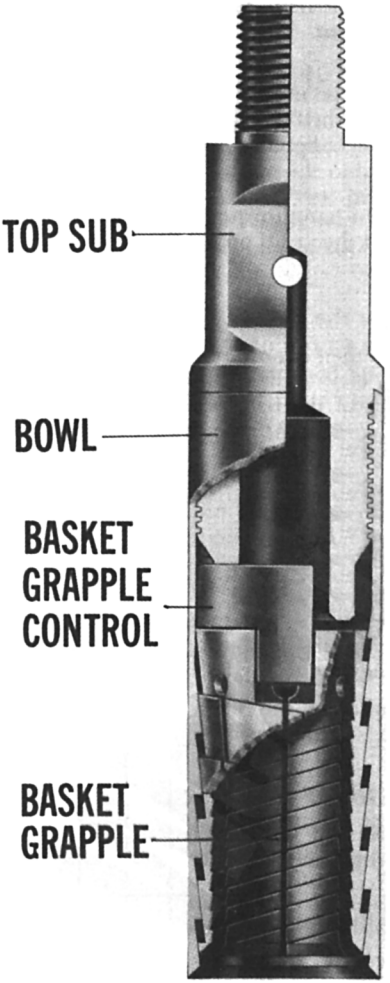
BOWEN SUCKER ROD OVERSHOTS
SERIES 20



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DATA-BOWEN SHORT CATCH SUCKER ROD OVERSHOT

SERIES 20

Grapple Number	Maximum Catch In.	Maximum Catch mm	Overshot O.D. In.	Standard Box Connection	Type	Assembly Part Number	Load Capacity At Yield Lbs.
17318	7/8	**22.2**	1-1/4	5/8 Rod	SH	17315	31500
25783	1''	**25.4**	1-3/8	5/8 Rod	SH	25780	31500
28777	1-1/8	**28.6**	1-1/2	5/8 Rod	SH	28774	35100
28763	1-1/4	**31.8**	1-5/8	5/8 Rod	SH	28760	42200
18358	1-3/8	**34.9**	1-3/4	3/4 Rod	SH	18355	35100
34604	1-3/8	**34.9**	1-3/4	3/4 Rod LH	SH	34601**	40900
11557	1-1/2	**38.1**	1-29/32	3/4 Rod	SH	11555	41000
17440	1-13/16	**46.0**	2-5/16	7/8 Rod	SH	17438	50400
17440	1-13/16	**46.0**	2-5/16	7/8 Rod LH	SH	30421*	60200
18308	2-1/8	**54.0**	2-25/32	7/8 Rod	SH	18305	102300
18308	2-1/8	**54.0**	2-7/8	2-3/8 TBG	FS	20170	101800
20648	2-3/8	**60.3**	3-1/8	2-3/8 TBG	SH	20645	127000
22273	2-1/2	**63.5**	3-1/4	2-3/8 TBG	FS	22270	127000

Special Notes:

(1) Grapples available in 1/16'' intervals.

F.S. (Full Strength) Engineered to withstand all pulling, jarring, and torsional strain

S.H. (Slim-Hole) Engineered to withstand heavy pulling strain only

* Left Hand Thread

** This is a Left-Hand Tool

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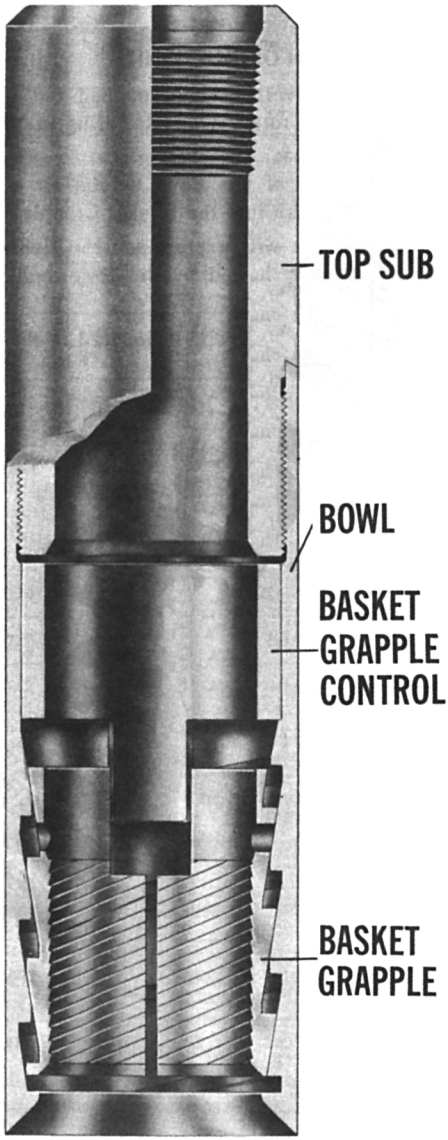
BOWEN SHORT CATCH OVERSHOTS

(Patented)

SERIES 70



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DATA-BOWEN SHORT CATCH OVERSHOT
SERIES 70

Grapple Number	Maximum Catch		Standard Over-shot O.D.	Standard Box Connection	Type	Assembly Part Number	Load Capacity At Yield Point	
							Without Stop	With Stop
	In.	mm	In.				Lbs.	Lbs.
38509	1-5/8	**41.3**	2-5/16	7/8 S.R. Pin	SH	38506	85200	–
17618	2-1/2	**63.5**	3-5/8	2-1/2 EUE	SH	17615	263600	–
13538	2-5/8	**66.7**	3-3/4	2-3/8 API Reg.	SH	13535	239800	239800
10437*	3-1/16	**77.8**	4-1/8	2-7/8 API Reg.	SH	10434	212700	212700
11292	3-1/16	**77.8**	4-5/8	2-1/2 EUE	FS	11290	398100	398100
B-11026	3-3/8	**85.7**	4-3/8	2-7/8 API Reg.	SH	C-11023	250300	–
10437	3-11/16	**93.7**	4-11/16	2-7/8 " Reg.		10434	697300	571300
10546*	3-21/32	**92.9**	4-11/16	2-7/8 API Reg.	SH	10543	197600	197600
11300	3-21/32	**92.9**	5-5/8	3-1/2 FH	FS	11297	790500	635700
12647	3-3/4	**95.2**	4-3/4	3-1/2 FH	SH	12645	267100	267100
12788	3-3/4	**95.2**	5-1/2	3-1/2 FH	FS	12785	907000	729300
13068	4-1/4	**107.9**	5-3/4	3-1/2 FH	FS	13065	575600	467400
10546	3-21/32	**92.9**	5-7/8	2-7/8 API Reg.		10543	1283600	1011300
10563*	4-3/4	**120.6**	5-7/8	3-1/2 IF	SH	10560	373100	328100
11306	4-3/4	**120.6**	6-5/8	4-1/2 FH	FS	11303	720600	599400
14808	5-1/4	**133.3**	6-1/4	4-1/2 API Reg.	SH	14805	319700	–
38936	5-5/8	**142.9**	7-3/8	4-1/2 IF	FS	38933	–	–
11633	6''	**152.4**	7-5/8	4-1/2 FH	FS	11630	445300	358000
10563	4-3/4	**120.6**	6-5/8	3-1/2 IF		10560	980700	743200
16978	6-1/4	**158.7**	7-7/8	4-1/2 IF	FS	16975	445700	349200
38942	6-1/2	**165.1**	8-1/4	5-1/2 API Reg.	FS	38939	445700	–
20053	7''	**177.8**	8-1/2	4-1/2 FH	FS	20050	373700	285100
39428	7-1/4	**184.1**	9	4-1/2 IF	FS	39425	–	–
38948	7-5/8	**193.7**	9-3/8	6-5/8 API Reg.	FS	38945	–	–
25033	7-3/4	**196.8**	9-1/4	4-1/2 IF	FS	25030	391700	–
20063	8''	**203.2**	9-3/4	6-5/8 API Reg.	FS	20060	445100	–
38954	8-1/8	**206.4**	9-7/8	6-5/8 API Reg.	FS	38951	–	–
33881	9''	**228.6**	11-1/4	7-5/8 API Reg.	FS	33878	874800	–
36242	12-1/4	**311.1**	15''	8-5/8 API Reg.	FS	36239	934800	–

FS (Full Strength) Engineered to utilize all possible strength consistent with usual hole size conditions.
SH (Slim-Hole) Engineered to best utilize the available wall thickness allowed by reduced hole size conditions.
* Standard O.D.

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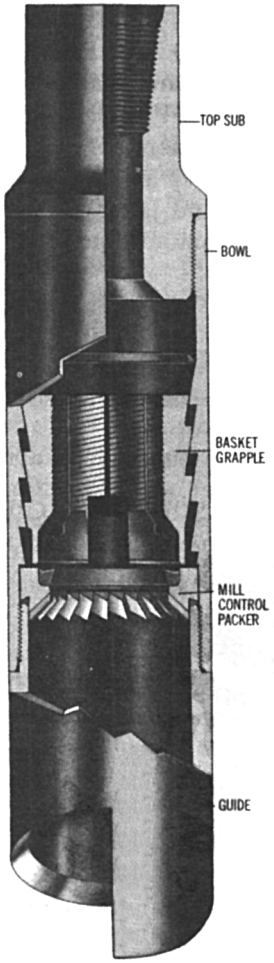
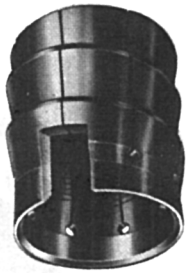
BOWEN OVERSHOTS
SERIES 150





Basket Grapple

Basket Grapple Control

Basket Grapple Mill Control Packer

Series 150 Bowen Releasing and Circulating Overshot Dressed With Basket Grapple and Parts. Patented.

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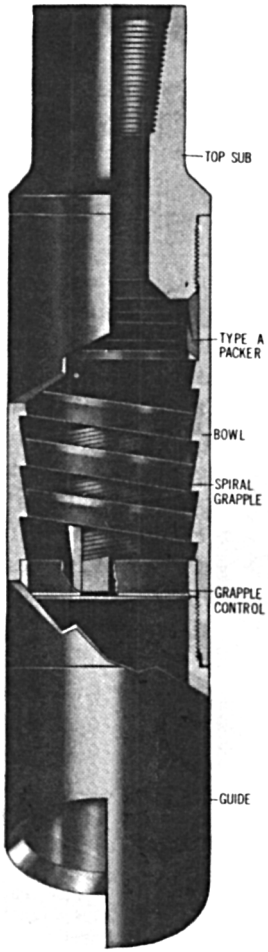
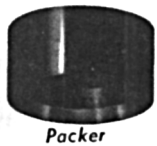
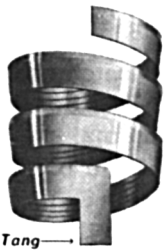
BOWEN OVERSHOTS
SERIES 150

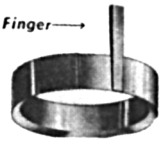




Packer
Type A



Spiral Grapple



Spiral Grapple Control

Series 150
Bowen Releasing And
Circulating Overshot
Dressed With Spiral
Grapple And Parts
Patented

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DATA-BOWEN RELEASING OVERSHOT
SERIES150

Grapple Number	Maximm Catch Spiral In.	Spiral mm.	Basket In.	Basket mm	Overshot O.D. In.	Standard Box Connection	Type	Ass'y Part Number	Load Cap. At Yield Point Spiral Lbs.	Basket W-o/Stop Lbs.	Basket W/Stop Lbs.
M-9403	2	**50.8**	1-3/4	**44.5**	2-5/16	1-13/16 W.F.J.	S.H.	B-8919	68000	47000	30000
B-10204	2-1/8	**54.0**	1-3/4	**44.5**	2-5/8	1-1/2 E.U.E.	S.H.	C-10199	101600	86400	61000
16392	*2-1/8*	***54.0***	*1-3/4*	***44.5***	*2-7/8*	*1-1/2 E.U.E.*	*S.H.*	*16395*	193500	*173200*	*110200*
9307	*2-3/8*	***60.3***	*2''*	***50.8***	*3-1/8*	*2'' E.U.E.*	*X.S.H.*	*9305*	*193500*	*173200*	*118000*
M-9307	2-3/8	**60.3**	2''	**50.8**	3-1/8	2'' E.U.E.	X.S.H.	M-9305	*215526*	184312	122700
B-5077	2-3/8	**60.3**	1-7/8	**47.6**	3-1/4	2-3/8 Reg.	S.H.	C-5072	211500	190000	119800
B-782	2-3/8	**60.3**	1-7/8	**47.6**	3-1/2	2-3/8 I.F.	F.S.	C-4741	309000	265000	167000
1448	*2-3/8*	***60.3***	*1-7/8*	***47.6***	*4-1/8*	*2-1/2 E.U.E.*	*F.S.*	*1443*	*455000*	*390000*	*265000*
B-5091	2-1/2	**63.5**	2''	**50.8**	3-3/8	2-3/8 Reg.	S.H.	C-4623	218000	196500	123700
B-5085	2-1/2	**63.5**	2''	**50.8**	3-5/8	2'' E.U.E.	F.S.	C-5080	291800	263000	118200
9272	*2-7/8*	***73.0***	*2-19/32*	***65.9***	*3-5/8*	*2'' E.U.E.*	*X.S.H.*	*9270*	*193500*	*157400*	*78700*
M-9272	2-7/8	**73.0**	2-1/2	**63.5**	3-5/8	2'' E.U.E.	X.S.H.	N-9270	229100	195900	102500
A-1829	2-7/8	**73.0**	2-3/8	**60.3**	3-3/4	2-3/8 Reg.	S.H.	C-1827	214000	192800	121400
M-805	2-7/8	**73.0**	2-3/8	**60.3**	4	2-1/2 E.U.E.	F.S.	C-4736	304000	221500	199000
805	2-7/8	**73.0**	2-3/8	**60.3**	4-1/8	2-1/2 E.U.E.	F.S.	4390	349000	264000	176000
B-9242	*3*	***76.2***	*2-5/8*	***66.7***	*3-5/8*	*2-3/8 I.F.*	*S.H.*	*9237*	*129184*	*107435*	*55313*
37590	3-1/16	**77.8**	2-11/16	**68.3**	3-3/4	2-3/8 I.F.	S.H.	37585	217700	221200	179700
B-3596	*3-1/16*	***77.8***	*2-19/32*	***65.9***	*3-15/16*	*2-3/8 Reg.*	*S.H.*	*c-5101*	*265400*	*219000*	*160100*
B-4403	3-1/16	**77.8**	2-19/32	**65.9**	4-3/16	2-7/8 Reg.	F.S.	C-5098	291800	263000	118200
B-1837	3-1/8	**79.4**	2-5/8	**66.7**	3-7/8	2-3/8 Reg.	S.H.	C-1835	155100	144200	98000
B-5109	3-1/8	**79.4**	2-5/8	**66.7**	4	2-7/8 Reg.	S.H.	C-5104	262900	217000	125100
1741	*3-1/8*	***79.4***	*2-5/8*	***66.7***	*4-1/2*	*2-1/2 E.U.E.*	*S.F.S.*	*9105*	*310200*	*255000*	*170000*
1741	*3-1/8*	***79.4***	*2-5/8*	***66.7***	*4-1/8*	*2'' E.U.E.*	*F.S.*	*8220*	*310200*	*255000*	*170000*
M-1741	3-1/8	**79.4**	2-5/8	**66.7**	4-1/8	2-1/2 E.U.E.	F.S.	N-9105	255000	210600	140000
B-791	3-1/8	**79.4**	2-5/8	**66.7**	4-1/4	2-7/8 Reg.	F.S.	C-4822	291800	263000	118200
B-5120	3-1/4	**82.6**	2-3/4	**69.9**	4-1/8	2-7/8 Reg.	S.H.	C-5115	225000	202000	127500
1518	3-1/4	**82.6**	2-3/4	**69.9**	4-3/8	2-7/8 I.F.	F.S.	9630			
B-3205	3-1/4	**82.6**	2-3/4	**69.9**	4-3/8	2-7/8 I.F.	F.S.	C-5112	254000	234200	147500
21305	*3-3/8*	***85.7***	*3-1/16*	***77.8***	*3-7/8*	*2-1/2 E.U.E.*	*X.S.H.*	21300	*102500*	*97500*	*66500*
B-4627	3-3/8	**85.7**	2-7/8	**73.0**	4-1/4	2-7/8 Reg.	S.H.	C-5126	262900	217000	116800
4195	3-3/8	**85.7**	2-7/8	**73.0**	4-3/8	2-7/8 I.F.	F.S.	9635	281500	249400	167900
M-4195	3-3/8	**85.7**	2-7/8	**73.0**	4-3/8	2-7/8 I.F.	F.S.	N-9635	248700	224000	152000
B-3359	3-3/8	**85.7**	2-7/8	**73.0**	4-1/2	2-3/8 I.F.	F.S.	C-5123	320000	280000	176000
B-3607	*3-1/2*	***88.9***	*2-7/8*	***73.0***	*4-3/8*	*2-7/8 Reg.*	*S.H.*	C-4619	*267400*	*220700*	*144300*
B-3607	3-1/2	**88.9**	2-7/8	**73.0**	4-1/2	2-7/8 I.F.	S.H.	C-3793	271000	226000	146500
1249	3-1/2	**88.9**	3''	**76.2**	4-5/8	3-1/2 Reg.	F.S.	1255	241000	256000	177000
M-164	3-1/2	**88.9**	2-7/8	**73.0**	4-13/16	3-1/2 F.H.	F.S.	C-4732	456000	396000	286000
M-164	3-1/2	**88.9**	2-7/8	**73.0**	5-1/8	3-1/2 I.F.	F.S.	C-4561	625000	526000	330000
17425	3-21/32	**92.9**	3-1/8	**79.4**	4-1/2	2-7/8 I.F.	S.H.	17420	343600	316500	249000
B-4339	3-21/32	**92.9**	3-1/8	**79.4**	4-1/2	2-1/2 E.U.E.	S.H.	17201	260400	233400	170500
B-4339	3-21/32	**92.9**	3-1/8	**79.4**	4-9/16	2-7/8 I.F.	S.H.	C-5151	276400	228100	157900
6662	*3-21/32*	***92.9***	*3.220*	***81.8***	*4-11/16*	*2-7/8 I.F.*	*S.F.S.*	9109	*332000*	*279000*	*199500*
L-6662	3-21/32	**92.9**	3-1/8	**79.4**	4-11/16	2-7/8 I.F.	F.S.	N-9109	366098	314021	212870
6662	3-21/32	**92.9**	3-1/8	**79.4**	4-11/16	3-1/2 Reg.	F.S.	12275	332000	279000	199500
B-4410	3-21/32	**92.9**	3-1/8	**79.4**	5	3-1/2 I.F.	F.S.	C-5148	394000	338000	210000
B-5133	3-3/4	**95.3**	3-7/32	**81.8**	4-5/8	2-7/8 I.F.	S.H.	C-5129	220000	198000	126000
9123	*3-3/4*	***95.3***	*3-1/4*	***82.6***	*4-11/16*	*2-7/8 I.F*	*F.S.*	9120	*261300*	*233000*	*138000*
L-9123	3-3/4	**95.3**	3-1/4	**82.6**	4-11/16	2-7/8 I.F.	F.S.	N-9120	261300	233000	116300
814	3-3/4	**95.3**	3-1/8	**79.4**	5	3-1/2 I.F.	F.S.	9725	391000	342600	244700
B-814	3-3/4	**95.3**	3-1/8	**79.4**	5-1/8	3-1/2 Reg.	F.S.	4686	489000	447000	354000

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DATA-BOWEN RELEASING OVERSHOT
SERIES 150

(Cont. from pg. 10-10)

Grapple Number	Maximum Catch Spiral In.	Maximum Catch Spiral mm	Maximum Catch Basket In.	Maximum Catch Basket mm	Overshot O.D. In.	Standard Box Connection	Type	Ass'y Part Number	Load Cap. At Yield Point Spiral Lbs.	Load Cap. At Yield Point Basket W-o/Stop Lbs.	Load Cap. At Yield Point Basket W/Stop Lbs.
B-9777	3-13/16	**96.8**	3-5/16	**84.1**	4-7/16	2-7/8 I.F.	SH	C - 9773	137500	118000	44800
B-9301	3-13/16	**96.8**	3-7/32	**81.8**	4-11/16	3-1/2 Reg.	SH	C - 9296	265000	214000	106000
B-2192	3-13/16	**96.8**	3-3/16	**81.0**	5-1/8	3-1/2 I.F.	FS	C - 7497	431000	381000	275000
B-6234	*3-7/8*	***98.4***	*3-3/8*	***85.7***	*4-5/8*	*2-7/8 Reg.*	*SH*	*C - 6230*	*186800*	*166700*	*104200*
B-1709	3-7/8	**98.4**	3-3/8	**85.7**	4-3/4	2-7/8 Reg.	SH	C - 5139	370000	232000	160000
M-859	3-7/8	**98.4**	3-1/4	**82.6**	5-3/16	3-1/2 F.H.	FS	C - 5136	391000	352500	254500
859	3-7/8	**98.4**	3-1/4	**82.6**	5-1/4	3-1/2 I.F.	FS	9515	451000	389500	276500
5159	*4*	***101.6***	*3-1/2*	***88.9***	*4-7/8*	*2-7/8 Reg.*	*SH*	*5168*	*306200*	*222000*	*126000*
B-5159	4	**101.6**	3-1/2	**88.9**	4-7/8	2-7/8 Reg.	SH	C - 5154	306200	222000	126000
B-1505	4	**101.6**	3-3/8	**85.7**	5-5/16	3-1/2 I.F.	FS	C - 5142	402000	351000	273000
B-4897	4-1/8	**104.8**	3-5/8	**92.1**	5	2-7/8 I.F.	SH	C - 5428	296500	258500	201000
B-1997	4-1/8	**104.8**	3-1/2	**88.9**	5-7/16	3-1/2 I.F.	FS	C - 5425	547600	435500	277100
B-4674	4-1/4	**108.0**	3-3/4	**95.3**	5-1/8	3-1/2 Reg.	SH	C - 5162	356800	301000	232200
4674	4-1/4	**108.0**	3-3/4	**95.3**	5-1/4	2-7/8 I.F.	SH	4716	312500	264000	196000
165	*4-1/4*	***108.0***	*3-11/16*	***93.7***	*5-9/16*	*3-1/2 F.H.*	*FS*	*5896*	*526600*	*494300*	*362500*
M-165	4-1/4	**108.0**	3-11/16	**93.7**	5-9/16	3-1/2 F.H.	FS	C - 4819	439200	396000	286000
B-2489	4-1/2	**114.3**	3-7/8	**98.4**	5-3/8	3-1/2 I.F.	SH	C - 5165	297000	258000	186200
B-2489	4-1/2	**114.3**	3-7/8	**98.4**	5-5/8	3-1/2 I.F.	FS	C - 3796	268000	320000	211000
B-1987	4-1/2	**114.3**	3-7/8	**98.4**	5-13/16	3-1/2 Reg.	FS	C - 4814	439200	396000	286000
M-1135	4-5/8	**117.5**	4-1/8	**104.8**	5-1/2	3-1/2 I.F.	SH	C - 4969	297000	258000	186200
1135	*4-5/8*	***117.5***	*4-1/8*	***104.8***	*5-5/8*	*3-1/2 F.H.*	*FS*	*5698*	*420000*	*378500*	*273000*
M-1135	4-5/8	**117.5**	4-1/8	**104.8**	5-5/8	3-1/2 F.H.	FS	M - 5698	349600	315000	227000
196	4-5/8	**117.5**	4	**101.6**	5-15/16	3-1/2 I.F.	FS	5737	514100	421300	297400
M-196	4-5/8	**117.5**	4	**101.6**	5-15/16	3-1/2 I.F.	FS	C - 4844	439200	395800	285800
B-2201	*4-3/4*	***120.7***	*4-1/4*	***108.0***	*5-5/8*	*3-1/2 I.F.*	*SH*	*C - 5168*	*360400*	*308400*	*234500*
6112	*4-3/4*	***120.7***	*4-1/4*	***108.0***	*5-3/4*	*3-1/2 F.H.*	*FS*	*8975*	*432900*	*411600*	*303275*
M-6112	4-3/4	**120.7**	4-1/4	**108.0**	5-3/4	3-1/2 F.H.	FS	N - 8975	338000	233000	116600
2364	4-3/4	**120.7**	4-1/8	**104.8**	6-1/16	4-1/2 Reg.	FS	8940	422000	354000	253000
B-2364	4-3/4	**120.7**	4-1/8	**104.8**	6-1/16	4-1/2 F.H.	FS	C - 4829	431000	381000	275500
B-6389	4-7/8	**123.8**	4-1/4	**108.0**	5-3/4	3-1/2 I.F.	SH	C - 7096	273500	230700	178000
9022	4-7/8	**123.8**	4-1/4	**108.0**	6	4-1/2 Reg.	FS	9026	405000	343000	284000
1182	4-7/8	**123.8**	4-1/4	**108.0**	6-1/8	3-1/2 F.H.	FS	912	405000	367000	298000
M-1182	4-7/8	**123.8**	4-1/4	**108.0**	6-1/8	3-1/2 F.H.	FS	D - 912	484000	441600	326000
B-2457	4-7/8	**123.8**	4-1/4	**108.0**	6-3/16	3-1/2 I.F.	FS	C - 7093	404500	341200	282700
1182	4-7/8	**123.8**	4-1/4	**108.0**	6-3/8	4-1/2 Reg.	FS	3061	558000	510000	369000
B-4369	*5*	***127.0***	*4-1/2*	***114.3***	*5-7/8*	*3-1/2 I.F.*	*SH*	*C - 5171*	*323500*	*238500*	*218500*
5942	*5*	***127.0***	*4-3/8*	***111.1***	*6-1/8*	*3-1/2 F.H.*	*SFS*	*7787*	*468000*	*440000*	*322000*
M-1071	*5*	***127.0***	4-1/4	**108.0**	6-5/8	4-1/2 I.F.	FS	C - 4825	637000	574300	462000
B-11828	5-1/8	**130.2**	4-5/8	**117.5**	5-3/4	4'' F.H.	SH	C - 11823	135000	115000	71500
9201	5-1/4	**133.4**	4-5/8	**117.5**	6-3/8	3-1/2 F.H.	SH	4770			
4498	5-1/4	***133.4***	*4-5/8*	***117.5***	*6-3/8*	*3-1/2 F.H.*	*SH*	*6655*	*403000*	*356000*	*256000*
M-4498	*5-1/4*	***133.4***	4-5/8	**117.5**	6-3/8	3-1/2 F.H.	SH	N - 6655	397400	358400	278500
B-4472	5-1/4	**133.4**	4-1/2	**114.3**	6-7/8	3-1/2 Reg.	FS	C - 5174	637000	574300	462000
9207	5-3/8	**136.5**	4-3/4	**120.7**	6-1/2	3-1/2 I.F.	SH	4773	350000	294000	210000
8619	5-1/2	***139.7***	*4-7/8*	***123.8***	*6-5/8*	*3-1/2 I.F.*	*SH*	*8625*	*386000*	*325000*	*232000*
9213	*5-1/2*	***139.7***	4-7/8	**123.8**	6-5/8	3-1/2 I.F.	SH	4776	444000	379000	293000
B-5182	5-1/2	**139.7**	4-3/4	**120.7**	6-5/8	4-1/2 I.F.	SH	C - 5178	399000	350500	281300
B-759	5-1/2	**139.7**	4-3/4	**120.7**	7-1/8	4-1/2 F.H.	FS	C - 5176	637500	574300	462000
B-5190	5-9/16	**141.3**	4-13/16	**122.2**	6-11/16	3-1/2 I.F.	SH	C - 5185	420000	369000	296000
103	5-9/16	**141.3**	4-13/16	**122.2**	6-15/16	4-1/2 F.H.	FS	8943			
M-103	5-9/16	**141.3**	4-13/16	**122.2**	7-1/4	3-1/4 I.F.	FS	C - 3810	675200	608400	489400

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DATA-BOWEN RELEASING OVERSHOT
SERIES 150

(Cont. from pg. 10-11)

Grapple Number	Maximm Catch Spiral In.	Maximm Catch Spiral mm.	Maximm Catch Basket In.	Maximm Catch Basket mm	Overshot O.D. In.	Standard Box Connection	Type	Ass'y Part Number	Load Cap. At Yield Point Spiral Lbs.	Load Cap. At Yield Point Basket w-o/Stop Lbs.	Load Cap. At Yield Point Basket W/Stop Lbs.
M-9035	5-5/8	**142.9**	5	**127.0**	6-3/4	3-1/2F.H.	X.S.H.	9038	405000	347000	289000
6699	*5-3/4*	***146.1***	*5-1/8*	***130.2***	*6-7/8*	*4-1/2 F.H.*	*S.H.*	*8978*	*367000*	*332000*	*253000*
B-3481	5-3/4	**146.1**	5	**127.0**	6-7/8	4-1/2 F.H.	S.H.	C-5193	399000	350500	238000
104	5-3/4	**146.1**	5	**127.0**	7-3/8	4-1/2 F.H.	F.S.	6150	637000	542250	421750
M-104	5-3/4	**146.1**	5	**127.0**	7-3/8	4-1/2 F.H.	F.S.	D-6150	656800	564000	372700
M-104	5-3/4	**146.1**	5	**127.0**	7-3/8	4-1/2 F.H.	F.S.	C-4689	637500	574300	462000
B-5201	6	**152.4**	5-3/8	**136.5**	7-1/8	3-1/2 I.F.	S.H.	C-5196	435000	392000	298000
220	*6*	***152.4***	*5-1/4*	***133.4***	*7-1/2*	*4-1/2 F.H.*	*F.S.*	*9996*	*590000*	*512000*	*390000*
220	6	**152.4**	5-1/4	**133.4**	7-5/8	5-1/2 Reg.	F.S.	247	670000	580000	442000
M-220	6	**152.4**	5-1/4	**133.4**	7-5/8	4-1/2 I.F.	F.S.	C-3364	637500	574300	462000
220	*6*	***152.4***	*5-1/4*	***133.4***	*7-5/8*	*4-1/2 F.H.*	*F.S.*	*7572*	*611300*	*532600*	*404300*
B-5211	6-1/8	**155.6**	5-1/2	**139.7**	7-1/4	4-1/2 F.H.	S.H.	C-5206	435000	392000	298000
B-2063	6-1/8	**155.6**	5-3/8	**136.5**	7-3/4	4-1/2 F.H.	F.S.	C-5204	637000	574300	462000
9687	6-1/4	**158.8**	5-5/8	**142.9**	7-3/8	4-1/2 F.H.	S.H.	12567	471000	448000	283000
9687	6-1/4	**158.8**	5-5/8	**142.9**	7-3/8	4-1/2 F.H.	S.H.	9692	450400	427283	327900
9687	6-1/4	**158.8**	5-5/8	**142.9**	7-3/8	4-1/2 I.F.	S.H.	12565	471000	448000	283000
B-4694	*6-1/4*	***158.8***	*5-1/2*	***139.7***	*7-3/8*	*4-1/2 F.H.*	*S.H.*	*C-4691*	*414100*	*373100*	*283600*
M-9687	*6-1/4*	***158.8***	*5-5/8*	***142.9***	*7-3/8*	*4-1/2 F.H.*	*S.H.*	*N-9692*	*467600*	*444000*	*340400*
1644	*6-1/4*	***158.8***	*5-9/16*	***141.3***	*7-5/8*	*4-1/2 F.H.*	*S.F.S.*	*8741*	*502100*	*449900*	*363200*
1644	*6-1/4*	***158.8***	*5-9/16*	***141.3***	*7-5/8*	*4-1/2 I.F.*	*S.F.S.*	*1873*	542468	*479044*	*364490*
1644	6-1/4	**158.8**	5-9/16	**141.3**	7-5/8	5-1/2 Reg.	S.F.S.	19090	542500	479000	364500
M-1644	6-1/4	**158.8**	5-9/16	**141.3**	7-5/8	4-1/2 F.H.	S.F.S.	N-8741	542468	479044	364490
1659	6-1/4	**158.8**	5-9/16	**141.3**	7-7/8	4-1/2 I.F.	F.S.	7791	627600	542400	395000
1659	6-1/4	**158.8**	5-9/16	**141.3**	7-7/8	4-1/2 F.H.	F.S.	9678	655000	570000	428000
1659	6-1/4	**158.8**	5-9/16	**141.3**	7-7/8	4-1/2 I.F.	F.S.	9983	655000	570000	428000
B-2073	6-1/4	**158.8**	5-1/2	**139.7**	7-7-8	4-1/2 I.F.	F.S.	C-2108	586800	515600	413700
B-2073	6-1/4	**158.8**	5-1/2	**139.7**	7-7/8	5-1/2 Reg.	F.S.	C-8841	640000	560000	468000
M-1659	6-1/4	**158.8**	5-9/16	**141.3**	7-7/8	4-1/2 I.F.	F.S.	D-7791	645300	564000	482000
9003	6-3/8	**161.9**	5-3/4	**146.1**	7-1/2	4-1/2 I.F.	S.H.	9009	479000	454000	339000
M-9003	6-3/8	**161.9**	5-3/4	**146.1**	7-1/2	4-1/2 I.F.	S.H.	M-9009	459600	435300	323700
9003	6-3/8	**161.9**	5-3/4	**146.1**	7-1/2	4-1/2 F.H.	S.H.	9746	479000	454000	339000
5503	6-3/8	**161.9**	5-5/8	**142.9**	7-3/4	4-1/2 I.F.	S.F.S.	9163	523500	456000	346500
B-5349	6-1/2	**165.1**	5-3/4	**146.1**	7-5/8	4-1/2 F.H.	S.H.	C-5344	430000	385000	295000
M-9863	*6-1/2*	***165.1***	*5-7/8*	***149.2***	*7-5/8*	*4-1/2 F.H.*	*S.H.*	*M-9860*	*448900*	*425100*	*352459*
9863	6-1/2	**165.1**	5-7/8	**149.2**	7-5/8	4-1/2 F.H.	S.H.	9860	418200	396700	322900
9863	6-1/2	**165.1**	5-7/8	**149.2**	8-1/8	4-1/2 F.H.	F.S.	9677	420000	400000	325000
B-2374	*6-1/2*	***165.1***	*5-3/4*	***146.1***	*8-1/8*	*4-1/2 I.F.*	*F.S.*	*C-5342*	*586500*	*515500*	*413500*
5652	6-1/2	**165.1**	5-3/4	**146.1**	8-1/4	5-1/2 F.H.	F.S.	2380	760000	650000	552000
5652	6-1/2	**165.1**	5-3/4	**146.1**	8-1/4	4-1/2 F.H.	F.S.	7796	760000	650000	552000
9137	6-5/8	**168.3**	6	**152.4**	7-3/4	4-1/2 F.H.	S.H.	4785	422000	400000	318000
M-9137	6-5/8	**168.3**	6	**152.4**	7-3/4	4-1/2 F.H.	S.H.	N-4785	345000	315000	227000
M-9137	6-5/8	**168.3**	6	**152.4**	7-3/4	4-1/2 I.F.	S.H.	B-11322	345000	315000	227000
B-5219	6-5/8	**168.3**	5-7/8	**149.2**	7-3/4	5-1/2 Reg.	S.H.	C-5214	350000	306000	246000
84	6-5/8	**168.3**	5-7/8	**149.2**	8-1/8	4-1/2 I.F.	S.F.S.	9339	590000	500000	403000
84	6-5/8	**168.3**	5-7/8	**149.2**	8-1/8	5-1/2 Reg.	S.F.S.	8949	590000	500000	403000
M-84	6-5/8	**168.3**	5-7/8	**149.2**	8-1/8	4-1/2 I.F.	S.F.S.	M-9339	587000	505500	382500
N-84	6-5/8	**168.3**	5-7/8	**149.2**	8-1/4	5-1/2 F.H.	F.S.	C-3032	637500	574300	462000
B-5227	6-3/4	**171.5**	6-1/8	**155.6**	7-7/8	5-1/2 Reg.	S.H.	16500	413000	362500	246000
B-5227	6-3/4	**171.5**	6-1/8	**155.6**	8-1/8	4-1/2 I.F.	S.H.	C-5222	531900	467300	375000
209	6-3/4	**171.5**	6	**152.4**	8-3/8	4-1/2 I.F.	F.S.	275	637000	542250	408250
M-209	6-3/4	**171.5**	6	**152.4**	8-3/8	4-1/2 F.H.	F.S.	C-3833	612199	537860	365214

Common used overshots

(Cont. on pg. 10-13)

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DATA-BOWEN RELEASING OVERSHOT

SERIES 150

(Cont. from pg. 10-12)

Grapple Number	Maximum Catch Spiral In.	Maximum Catch Spiral mm	Maximum Catch Basket In.	Maximum Catch Basket mm	Overshot O.D. In.	Standard Box Connection	Type	Ass'y Part Number	Load Cap. At Yield Point Spiral Lbs.	Load Cap. At Yield Point Basket W-o/Stop Lbs.	Load Cap. At Yield Point Basket W/Stop Lbs.
8987	6-7/8	174.6	6-1/4	158.8	8	4-1/2 F.H.	S.H.	8995	443000	410000	318000
M-8987	*6-7/8*	*174.6*	*6-1/4*	*158.8*	*8*	*4-1/2 F.H.*	*S.H.*	*N-8995*	*436000*	*406900*	*350000*
9222	7	177.8	6-3/8	161.9	8-1/8	4-1/2 F.H.	S.H.	9815	453000	429500	329500
9222	*7*	*177.8*	*6-3/8*	*161.9*	*8-1/8*	*4-1/2 F.H.*	*S.H.*	*9217*	*453000*	*429500*	*329500*
B-3267	*7*	*177.8*	*6-1/4*	*158.8*	*8-1/8*	*5-1/2 F.H.*	*S.H.*	*C-3263*	*439200*	*395800*	*318400*
9222	*7*	*177.8*	*6-3/8*	*161.9*	*8-3/8*	*4-1/2 I.F.*	*S.H.*	*17208*	*587977*	*557764*	*428051*
105	7	177.8	6-1/4	158.8	8-5/8	6-5/8 Reg.	F.S.	6140			
105	7	177.8	6-1/4	158.8	8-5/8	4-1/2 I.F.	F.S.	7800	637000	542250	408250
N-105	7	177.8	6-1/4	158.8	8-5/8	4-1/2 I.F.	F.S.	C-4817	637000	574300	462000
9229	7-1/8	181.0	6-1/2	165.1	8-1/4	4-1/2 F.H.	S.H.	9570	422000	400000	307000
B-5359	7-1/4	184.2	6-5/8	168.3	8-3/8	4-1/2 I.F.	S.H.	C-5354	430000	385000	295000
1027	7-1/4	184.2	6-1/2	165.1	8-7/8	4-1/2 F.H.	F.S.	7805	637000	542250	408250
M-1027	7-1/4	184.2	6-1/2	165.1	8-7/8	4-1/2 I.F.	F.S.	C-5352	586900	515600	426500
9235	*7-3/8*	*187.3*	*6-3/4*	*171.5*	*8-1/2*	*4-1/2 F.H.*	*S.H.*	*4793*	*422000*	*400000*	*309000*
B-5238	7-3/8	187.3	6-5/8	168.3	8-1/2	5-1/2 F.H.	S.H.	C-5233	416000	365000	292000
C-4156	7-3/8	187.3	6-5/8	168.3	9	5-1/2 F.H.	F.S.	C-5230	637000	574300	462000
12697	7-1/2	190.5	6-7/8	174.6	8-5/8	4-1/2 F.H.	S.H.	12692	458000	414400	313400
B-7106	7-1/2	190.5	6-7/8	174.6	8-5/8	4-1/2 I.F.	S.H.	C-7101	436000	385000	309000
9292	7-1/2	190.5	6-3/4	171.5	9-1/8	5-1/2 F.H.	SFS.	9290	660200	547500	409000
B-3454	7-1/2	190.5	6-3/4	171.5	9-1/8	4-1/2 F.H.	F.S.	C-7099	637000	574300	462000
9241	7-5/8	193.7	7	177.8	8-3/4	5-1/2 Reg.	S.H.	4796	458000	435000	333000
B-5254	7-5/8	193.7	6-7/8	174.6	8-3/4	6-5/8 Reg.	S.H.	C-5249	430000	385000	295000
B-5246	7-5/8	193.7	6-7/8	174.6	9-1/4	5-1/2 F.H.	F.S.	C-5241	657000	578000	465000
9853	*7-3/4*	*196.9*	*7-1/8*	*181.0*	*8-7/8*	*4-1/2 I.F.*	*S.H.*	*9850*	*458000*	*435000*	*333000*
5262	7-3/4	196.9	7-1/8	181.0	8-7/8	4-1/2 I.F.	S.H.	5257	416000	345000	276000
B-5262	7-3/4	196.9	7	177.8	8-7/8	4-1/2 I.F.	S.H.	C-5257	430000	385000	295000
85	7-3/4	196.9	7	177.8	9-3/8	4-1/2 I.F.	F.S.	1665	637000	542250	408250
85	7-3/4	196.9	7	177.8	9-3/8	6-5/8 Reg.	F.S.	7810	540000	475000	359000
N-85	*7-3/4*	*196.9*	*7*	*177.8*	*9-3/8*	*4-1/2 I.F.*	*F.S.*	*C-1500*	592000	*520000*	*340000*
9248	7-7/8	200.0	7-1/4	184.2	9	6-5/8 Reg.	S.H.	4816	422000	400000	309000
B-5270	8	203.2	7-3/8	187.3	9-1/8	4-1/2 I.F.	S.H.	C-5265	396000	347500	236000
238	8	203.2	7-1/4	184.2	9-5/8	6-5/8 Reg.	F.S.	264	602700	510750	398600
M-238	*8*	*203.2*	*7-1/4*	*184.2*	*9-5/8*	*6-5/8 Reg.*	*F.S.*	*N-264*	*625000*	*537800*	*406600*
M-238	8	203.2	7-1/4	184.2	9-5/8	6-5/8 Reg.	F.S.	C-4179	578300	508100	345000
9057	8-3/8	212.7	7-3/4	196.9	9-1/2	4-1/2 I.F.	S.H.	4834	422000	402000	309000
C-1232	8-3/8	212.7	7-5/8	193.7	10-1/16	6-5/8 Reg.	F.S.	C-1230	637500	574300	462000
B-5289	8-1/2	215.9	7-7/8	200.0	9-5/8	5-1/2 Reg.	S.H.	C-5284	419500	376000	341000
8957	8-1/2	215.9	7-3/4	196.9	10-1/8	6-5/8 Reg.	F.S.	8960	602700	492000	391000
M-8957	8-1/2	215.9	7-3/4	196.9	10-1/8	6-5/8 Reg.	F.S.	M-8960	624300	576700	445500
B-4430	8-1/2	215.9	7-3/4	196.9	10-1/8	6-5/8 Reg.	F.S.	C-5281	637000	574300	462000
9101	8-5/8	219.1	8	203.2	9-3/4	5-1/2 Reg.	XSH.	4837	458000	435000	333000
B-5302	8-5/8	219.1	7-7/8	200.0	10-1/4	7-5/8 Reg.	S.H.	C-5297	657000	578000	465000
B-1962	8-5/8	219.1	7-5/8	193.7	11	5-1/2 F.H.	F.S.	C-5292	1308000	1240000	1130000
8966	8-3/4	222.3	8''	203.2	10-1/2	5-1/2 Reg.	F.S.	8963	296000	251000	200000
B-5310	8-7/8	225.4	8-1/8	206.4	10-1/2	6-5/8 Reg.	F.S.	C-5305	586600	515400	413600
B-1874	8-7/8	225.4	8-1/8	206.4	11-1/4	7-5/8 Reg.	F.S.	C-1870	1605000	1580000	1395000
5326	9	228.6	8-1/4	209.6	10-5/8	6-5/8 Reg.	F.S.	5321	660000	556000	445000
B-5326	*9*	*228.6*	*8-1/4*	*209.6*	*10-5/8*	*6-5/8 Reg.*	*F.S.*	*C-5321*	*586800*	*515600*	*426500*
B-5318	9	228.6	8	203.2	11-3/8	5-1/2 Reg.	F.S	C-5313	1364000	1207000	942000

Common used overshots

(Cont. on pg. 10-14)

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DATA-BOWEN RELEASING OVERSHOT
SERIES 150

(Cont. from pg. 10-13)

Grapple Number	Maximum Catch Spiral In.	Maximum Catch Spiral mm	Maximum Catch Basket In.	Maximum Catch Basket mm	Overshot O.D. In.	Standard Box Connection	Type	Ass'y Part Number	Load Cap. At Yield Point Spiral Lbs.	Load Cap. At Yield Point Basket W-o/Stop Lbs.	Load Cap. At Yield Point Basket W/Stop Lbs.
15253	9-1/2	**241.3**	8-3/4	**222.3**	11-3/4	7-5/8 Reg.	F.S.	15250	966500	852000	635000
B-12827	*9-5/8*	***244.5***	*8-7/8*	***225.4***	*11-1/4*	*6-5/8 Reg.*	*F.S.*	*C-12822*	*536800*	*515600*	*413700*
8972	10	**254.0**	9-1/4	**235.0**	11-7./8	6-5/8 Reg.	F.S.	8969	828300	744000	558800
5334	10-1/8	**257.2**	9-3/8	**238.1**	11-3/4	5-1/2 I.F.	F.S.	5329	616000	528000	435000
B-5334	*10-1/8*	***257.2***	*9-3/8*	***238.1***	*11-3/4*	*6-5/8 Reg.*	*F.S.*	*C-5329*	660000	580000	468000
B-1971	10-1/8	**257.2**	9-1/8	**231.8**	12-1/2	6-5/8 Reg.	X.F.S.	C-1880	1364000	1207000	941700
15803	*11-1/4*	***285.7***	*10-1/2*	***266.7***	*12-3/4*		*F.S.*	*15800*	*605000*	*562250*	*444000*
33009	12	**304.8**	11-1/4	**285.7**	13-3/4	Customer		33006	1022314	745564	
68033	14	**355.6**	13-1/4	**336.5**	16	Order		68028	1164000	1175000	
64558	14-3/4	**374.6**	14	**355.6**	16-3/4	''		64553	1197674	1226777	
31658	16-3/4	**425.4**	16	**406.4**	20-3/4	''		31653	NA	1479060	1344600

More common used overshots

XFS (Extra full strength) Engineered for extreme abuse.

FS (Full Strength) Engineered to withstand all pulling, torsional and jarring strains.

SFS (Semi full strength) Engineered for special hole conditions commensurate with maximum strength.

SH (Slim Hole) Engineered to withstand heavy pulling strains only.

XSH (Extra slim hole) Engineered for pick-up jobs only.

Connections will vary from area to area.

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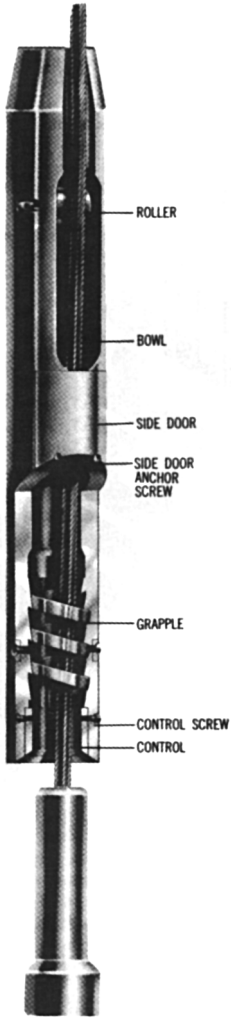
BOWEN SIDE DOOR OVERSHOTS
SERIES 160



Bowen Series 160 Side Door Overshots
are recommended for use when fishing for conductor line or cable tools in a cased hole.

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BOWEN OVERSHOTS

SERIES 160

Maximum Catch (Spiral)		2	2	2-3/8	2-3/8	2-3/8
Maximum Catch (Basket)		1-1/2 3-1/8	1-1/2 3-3/4	1-7/8 4	1-7/8 4-1/2	1-7/8 4-1/2
Overshot O.D. Top Connection		2-3/8 E.U.E. Box	2-7/8 API Reg.	2-3/8 API Reg. Box	Acme Str 6 Thd.	2-3/8 API Reg. Box
Complete Assembly	Part No.	15955	C-11145	9560	6400	9985
	Weight	60	65	70	195	105
	Grapple No.	1811	B-11147	1448	1448	1448

Maximum Catch (Spiral)		2-3/4	3-1/8	3-21/32
Maximum Catch (Basket)		2-1/4	2-5/8	3-1/8
Overshot O.D.		4-1/2	4-11/16	5-1/2
Top Connection		2-7/8 API Reg. Box	2-7/8 API Reg. Box	2-7/8 API Reg. Box
Complete Assembly	Part No.	9900	9965	9920
	Weight	167	139	177
	Grapple No.	9907	1741	6662

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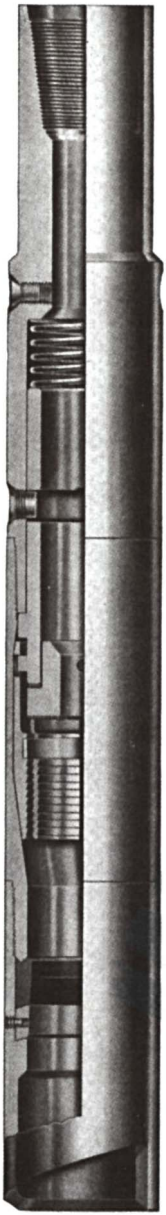

WEATHERFORD MCCULLOUGH ROTARY RELEASING OVERSHOT

The McCullough Rotary Releasing Overshot is strongly built and of simple construction. It will withstand the shocks and strains of severe jarring without damage to the tool. It is designed so that the slips completely encircle the pipe or fish to be recovered with a firm, secure grip. This tight, uniform grip around the entire circumference of the fish prevents collapse or bottlenecking.

This tool is designed to accommodate pack-off rubbers, extensions, wall hooks and over-size guide shoes, as desired. The tripping mechanism will permit the tool to be alternately set on, or released from the fish as many times as is necessary, without removing the overshot from the hole. The bore through the tool is of sufficient diameter to allow cutters, shots, or other tools to be run through the overshot and into the fish.

OPERATION

To operate the McCullough Overshot to engage the fish, a quarter of a turn to the left is all that is necessary to cause the slips to engage the pipe. Upon upward movement of the overshot, the slips grip the pipe firmly and securely. Positive release is accomplished by setting weight down to free the slips from the fish. A quarter of a turn to the right locks the skips in released position and allows the overshot to be removed from the hole.

The McCullough Rotary Releasing Overshot is made of selected materials with precision workmanship. It is rugged, dependable and easy to operate.

Also available with Short Catch Bowls.

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WEATHERFORD MCCULLOUGH ROTARY RELEASING OVERSHOT

Tool O.D.	Recommended Maximum Catch	Slip Range Minimum	Circulation Hole Through Upper Body	Tool Joint Size	Slip Hanger i.D.	Approx. Weight (Lbs.)
3-5/8''	2.375	.750	2'' or 1''	2-3/8 Reg.	1-3/4''	100
3-7/8''	2.875	2.219	1-1/4''	2-7/8 Reg.	2''	115
4''	3.062	2.312	1-1/4''	2-7/8 Reg.	2''	125
4-5/8''	3.125	2.219	2-1/2'' or 1-1/4''	2-7/8 Reg.	2-1/2''	150
5-3/8''	3.750	2.219	2-7/16''	3-1/2 F.H.	3''	190
5-7/8''	4.625	2.875	2-7/16''	3-1/2 F.H.	3-3/8''	250
6''	4.750	3.344	2-7/16''	3-1/2 F.H	3-3/8''	275
6-1/8''	5.000	3.344	2-7/16''	3-1/2 F.H.	3-5/8''	300
6-1/2''	4.812	3.469	2-7/16''	3-1/2 F.H.	3-3/4''	325
6-7/8''	5.062	3.344	3-5/32''	4-1/2 F.H.	4-1/16''	350
7-3/8''	6.250	5.468	3-5/32''	4-1/2 F.H.	4-5/8''	400
7-5/8''	6.250	3.281	3-5/32''	4-1/2 F.H.	4-3/4''	450
8-1/4''	6.750	4.219	4''	4-1/2 F.H. or 5-1/2Reg.	5-11/16''	550
8-5/8''	7.062	4.219	4''	5-1/2 F.H.	6''	575
9-1/4''	7.437	4.125	4''	6-5/8 Reg.	6-1/8''	625
10-1/8''	8.062	4.125	5''	6-5/8 F.H. or 6-5/8 Reg.	7-1/8''	750

Remarks:

7-5/8'' & 8-1/4'' Overshots can be fitted with a 46'' Extension Slip Hanger & Sleeve.

Turned Down Overshots

3-5/8'' Overshot turned to 3-1/2'' O.D.

6-1/8'' Overshot turned to 6'' O.D.

8-5/8'' Overshot turned to 8-1/2'' O.D.

WEATHERFORD MCCULLOUGH ROTARY RELEASING OVERSHOT PARTS

Part No.	Part Name	No. Req'd
351	Upper Body	1
353	Lower Body	1
355	Lip Shoe Guide	1
356	Slip Hanger	1
357	†Slips	*
358	†Packing Rubber	1
361	†Socket Head Screw	1
362	†Snap Ring	1
363	†Compression Spring	1
367	Packing Backup Ring	1
368	Stop Adapter	1
369	Backup Ring Screw	12 per set
370	Stop Adapter Screw	**
371	Vent Screw	2 per set

The following parts are available for special applications. They are not a part of the regular Overshot; if required must be ordered.

352	Upper Body-Casing Thread	1
354	Lip Shoe Guide-Oversize	1
364	Thread Protector-Flush	1
365	Thread Protector-Oversize	1

* 8-5/8'' O.D. and smaller Overshots have 6 Slips per Set Larger O.D. Overshots 8 Slips per Set.

** 8-5/8'' O.D. and smaller Overshots have 3 Stop Adapter Screws per Set. Larger O.D. Overshots, 4 Stop Adapter

Screws per Set.

† Additional parts recommended for export use; 6 Set of Slips; 10 Packing Rubbers; 5 Socket Head Screws; 5

Snap Rings; 1 Compression Spring.

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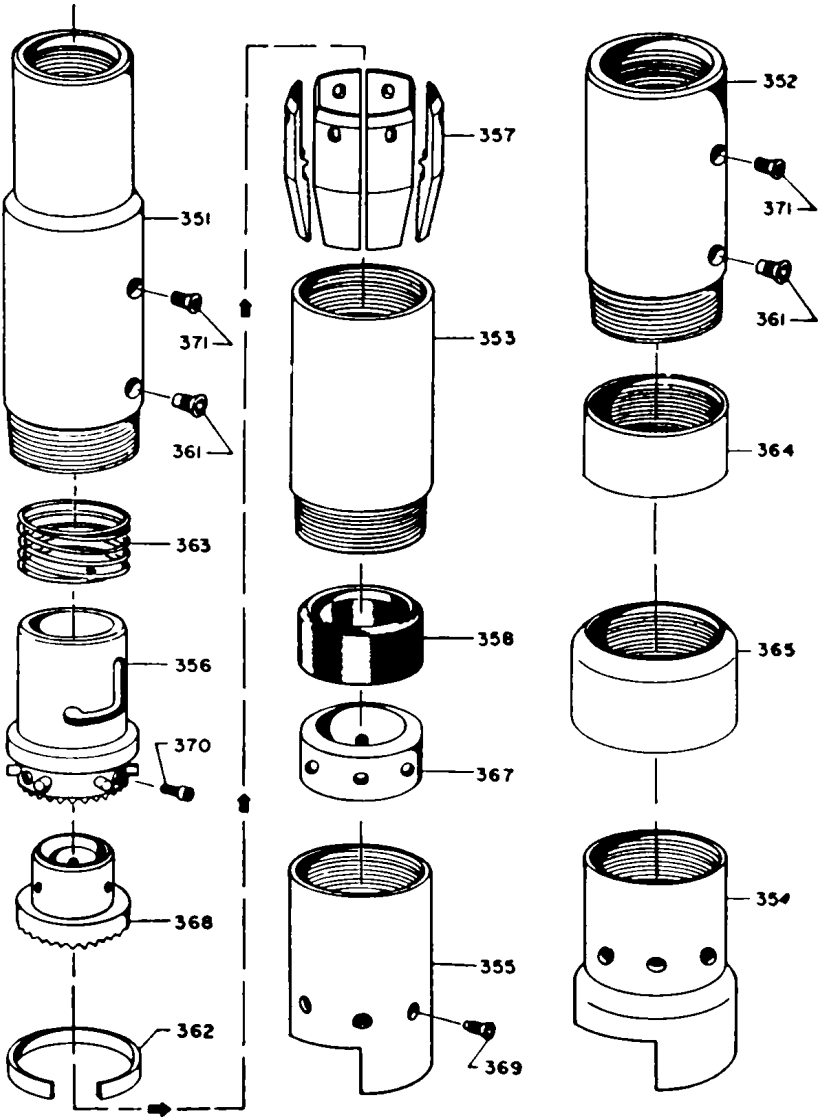

Parts for McCullough Rotary Releasing Overshot. Parts shown in the extreme right hand column of the above illustration are not a part of the regular Overshot as shown on Page 10-18, they are available for special applications and must be ordered additionally if required.

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WEATHERFORD MCCULLOUGH OVERSHOT

Overshot O.D. & Slip Size	Recommended Range	Theoretical Range
3-5/8 - AA	2.375 - 2.250	2.437 - 2.110
3-5/8 - A	2.250 - 2.125	2.312 - 1.985
3-5/8 - B	1.875 - 1.750	1.937 - 1.610
3-5/8 - C	1.625 - 1.500	1.687 - 1.360
3-5/8 - E	1.250 - 1.125	1.313 - .985
3-5/8 - G	1.000 - .875	1.063 - .735
3-5/8 - H	.750 - .625	.813 - .485
3-5/8 - I	.875 - .750	.938 - .610
3-7/8 - A	2.875 - 2.719	2.937 - 2.580
3-7/8 - B	2.656 - 2.500	2.719 - 2.361
3-7/8 - C	2.375 - 2.219	2.437 - 2.080
4 - A	3.062 - 3.000	3.125 - 2.886
4 - B	2.875 - 2.812	2.937 - 2.698
4 - C	2.656 - 2.594	2.718 - 2.479
4 - D	2.375 - 2.312	2.437 - 2.198
4-5/8 - A	3.125 - 2.969	3.187 - 2.829
4-5/8 - B	2.875 - 2.719	2.937 - 2.580
4-5/8 - C	2.656 - 2.500	2.719 - 2.361
4-5/8 - D	2.375 - 2.219	2.437 - 2.080
5-3/8 - A	3.750 - 3.469	3.812 - 3.335
5-3/8 - B	3.375 - 3.094	3.437 - 2.960
5-3/8 - C	2.875 - 2.594	2.937 - 2.460
5-3/8 - D	2.500 - 2.219	2.562 - 2.085
5-7/8 - A	4.625 - 4.469	4.687 - 4.330
5-7/8 - B	4.250 - 4.094	4.312 - 3.955
5-7/8 - C	4.000 - 3.844	4.062 - 3.704
5-7/8 - D	3.750 - 3.594	3.812 - 3.455
5-7/8 - E	3.500 - 3.344	3.562 - 3.204
5-7/8 - F	3.094 - 2.875	3.156 - 2.738
6 - A	4.750 - 4.594	4.812 - 4.454
6 - B	4.500 - 4.344	4.562 - 4.204
6 - C	4.250 - 4.094	4.312 - 3.954
6 - CC	4.000 - 3.844	4.062 - 3.704
6 - D	3.750 - 3.594	3.812 - 3.454
6 - E	3.500 - 3.344	3.562 - 3.204
6-1/8 - A	5.000 - 4.844	5.062 - 4.704
6-1/8 - B	4.750 - 4.594	4.812 - 4.454
6-1/8 - BB	4.500 - 4.344	4.562 - 4.204
6-1/8 - C	4.250 - 4.094	4.312 - 3.954
6-1/8 - CC	4.000 - 3.844	4.062 - 3.704
6-1/8 - D	3.750 - 3.594	3.812 - 3.454
6-1/8 - E	3.500 - 3.344	3.562 - 3.204
6-1/4	(Same Range and Size as 6-1/8 O.D.)	
6-1/2 - A	4.812 - 4.406	4.875 - 4.278
6-1/2 - B	4.375 - 3.969	4.437 - 3.840
6-1/2 - C	3.875 - 3.469	3.937 - 3.340
6-7/8 - A	5.062 - 4.656	5.125 - 4.528
6-7/8 - B	4.687 - 4.281	4.750 - 4.153
6-7/8 - C	4.250 - 3.844	4.312 - 3.715
6-7/8 - D	3.750 - 3.344	3.812 - 3.215

(Cont. on pg. 10-21)

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WEATHERFORD MCCULLOUGH OVERSHOT

Cont. from pg. 10-20)

Overshot O.D. & Slip Size	Recommended Range	Theoretical Range
7-5/8 - A	6.250 - 5.969	6.312 - 5.835
7-5/8 - B	5.937 - 5.656	6.000 - 5.523
7-5/8 - C	5.625 - 5.344	5.687 - 5.210
7-5/8 - CC	5.312 - 5.031	5.375 - 4.898
7-5/8 - D	5.000 - 4.719	5.062 - 4.585
7-5/8 - E	4.625 - 4.344	4.687 - 4.210
7-5/8 - F	3.562 - 3.281	3.625 - 3.148
8-1/4 - AA	6.750 - 6.468	6.812 - 6.335
8-1/4 - A	6.687 - 6.406	6.750 - 6.273
8-1/4 - B	6.312 - 6.031	6.375 - 5.898
8-1/4 - C	6.000 - 5.718	6.062 - 5.585
8-1/4 - CC	5.750 - 5.469	5.812 - 5.335
8-1/4 - D	5.562 - 5.281	5.625 - 5.148
8-1/4 - DD	5.250 - 4.969	5.312 - 4.835
8-1/4 - E	5.000 - 4.718	5.062 - 4.585
8-1/4 - F	4.500 - 4.219	4.562 - 4.085
8-5/8 - A	7.062 - 6.781	7.125 - 6.648
8-5/8 - B	6.812 - 6.531	6.875 - 6.398
8-5/8 - C	6.312 - 6.031	6.375 - 5.898
8-5/8 - D	6.000 - 5.718	6.062 - 5.585
8-5/8 - E	5.562 - 5.281	5.625 - 5.148
8-5/8 - F	5.000 - 4.718	5.062 - 4.585
8-5/8 - G	4.500 - 4.219	4.562 - 4.085
9-1/4 - A	7.437 - 7.000	7.500 - 6.863
9-1/4 - B	7.062 - 6.625	7.125 - 6.488
9-1/4 - C	6.562 - 6.125	6.625 - 5.988
9-1/4 - D	6 062 - 5.625	6.125 - 5.488
9-1/4 - E	5.625 - 5.187	5.687 - 5.050
9-1/4 - F	4.562 - 4.125	4.625 - 3.988
9-3/4 - A	7.812 - 7.375	7.875 - 7.238
9-3/4 - B	7.437 - 7.000	7.500 - 6.863
9-3/4 - C	7.062 - 6.625	7.125 - 6.488
9-3/4 - D	6.562 - 6.125	6.625 - 5.988
9-3/4 - E	6.062 - 5.625	6.125 - 5.488
9-3/4 - F	5.625 - 5.187	5.687 - 5.050
9-3/4 - G	4.562 - 4.125	4.625 - 3.988
10-1/8 - A	8.062 - 7.625	8.125 - 7.488
10-1/8 - BB	7.687 - 7.238	7.750 - 7.113
10-1/8 - B	7.062 - 6.625	7.125 - 6.488
10-1/8 - C	6.562 - 6.125	6.625 - 5.988
10-1/8 - D	6.062 - 5.625	6.125 - 5.488
10-1/8 - E	5.625 - 5.187	5.687 - 5.050
10-1/8 - F	4.562 - 4.125	4.625 - 3.988

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SECTION 11

PACKER RETRIEVERS & CASING ROLLERS

Page

H.E. Packer Retriever Spear ..... 1 - 2
Bowen Simplex ..... 3 - 5
Bowen Packer Retriever ..... 6 - 8
Bowen Casing Roller ..... 9 - 12
H.E. Reversing Tool ..... 13 - 24

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H-E PACKER RETRIEVER SPEAR

USE: The H-E Packer Retriever Spear is designed for the removal of drillable full bore packers form the well casing. If necessary, it will mill through the packer. Once through the packer, it will **remain in the proper catching position at all times** to engage the lower end of the packer.

FEATURES: Only three parts, Top Coupling, Mandrel and Slip, make up the PRS Spear. A Bull Plug is offered as optional equipment and can be dressed with tungsten carbide to mill through the packer is necessary.

OPERATION: The PRS Spear, dressed with the proper size slip for the bore of the packer, is made up on sufficient extensions to allow the spear to clear the packer below **before** the tungsten carbide shoe makes its initial contact. As the spear enters the bore of the packer, the slip is forced up and in an area where the O.D. is reduced enough to allow passage through the packer. As the slip clears the packer downward, it automatically drops in catch position. The tool is releasable with right hand control of the drill pipe. It can be re-engaged in the packer by merely lowering through the packer again.

After the packer has been milled over, it can now be retrieved with the PRS Spear. The tool will not prematurely release the packer under conditions of severe upward strain, or of sudden movement of the packer.

Detailed operation and maintenance instructions are available upon request. Ask for Manual No. 5-10.

SPECIFICATIONS AND PARTS LIST

Nominal Size - Inches	1-1/4	1-13/16	2	2-1/2	3
Catch Size (I.D. of Packer) - In.	1.250 to 1.531	1.791 to 2.370	2.468 to 3.250	3.000 to 4.250	3.938 to 5.000
Tool O.D. - In.	1-3/16	1-3/4	2-3/8	2-3/4	3-1/2
Tool I.D. - In.	1/4	3/8	3/8	1/2	3/4
Tool Length - In.	18	26	34	34	36
Tool Weight - Lbs.	8	12	36	49	74
Standard Box Connection - In.	Optional	1-13/16 WFJ-OS	1-1/4 API Reg.	2-3/8 WFJ	2-3/8 API Reg.
Standard Pin Connection - In.	Optional	1-13/16 WFJ-OS	1-1/4 API Reg.	2-3/8 WFJ	2-3/8 API Reg.
Complete Assembly Part No.	14079	14080	14081	14082	14083

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H-E "PRS" PACKER MILLING AND RETRIEVING TOOL

USE: The H-E Series "PRS" Packer Milling and Retrieving Tool is a combination of H-E products assembled to complete all the following in one trip.

1. Mill over a full bore packer until it releases
2. Catch the packer
3. Retrieve the packer

During all these steps, the spear may be released at any time.

FEATURES: The "PRS" Tool is composed of the PRS Packer Retriever Spear, Extension, Mill Body and Replaceable Mill or Long Rotary Shoe. The entire system can be furnished with special locked joint connections which prevent any possibility of whip-off during the milling operation. Circulation can be preset to occur at the mill, through the spear, or both.

The H-E Packer Mill Body has an API connection up and an extension connection down while the O.D. is threaded to receive either a mill shoe or a rotary shoe. This threading arrangement permits rapid replacement of mills. The H-E Replacement Mill or Rotary Shoe saves time and prevents stress damage to the mill body during dressing.

OPERATION: Make up the "PRS" Spear (with proper slip for bore of packer to be retrieved), Extensions, Mill Body and Mill Shoe or Rotary Shoe. Other tools recommended to be run above the assembly are the H-E boot-type Junk Basket and the H-E Bumper Jar.

Lower the entire Milling Assembly until the "PRS" Spear passes through the bore of the packer. The Mill Shoe can now mill away the holding slips and packing element of the packer. The string is raised and the "PRS" Spear will engage and retrieve the packer. Should the packer drop when the slips are milled away, the "PRS" Spear will catch it and allow retrieval.

Detailed operation and maintenance instructions are available upon request. Ask for Manual No. 5-20.

TOOL JOINT TYPE

Casing Size	2-7/8" - 3-1/2 "	4" - 5"	5-1/2" - 7"	7"- 9-5/8"	9-5/8" - 13-3/8"
Standard Pin Conn.	1-13/16" WFJ (NS) Box	2-3/8" API Reg. Pin	2-7/8" API Reg. Pin	3-1/2" API Reg. Pin	4-1/2" API Reg. Pin
Complete Assembly Part No.	15012	15014	15016	15018	15020

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BOWEN SIMPLEX PACKER RETRIEVERS

(PATENTED)

GENERAL DESCRIPTION

The BOWEN SIMPLEX PACKER RETRIEVER is an internally engaging fishing tool especially designed for the retrieving of "drillable" type production packers. With its accessory components (Stinger, Bushing and Mill Shoe), the BOWEN SIMPLEX PACKER RETRIEVER passes through the bore of the packer, prevents loss of the packer during milling and pulls the packer after it has been milled over, all in one trip. If necessary, the BOWEN SIMPLEX PACKER RETRIEVER can be released and reset to catching position - all without coming out of the hole.

USE

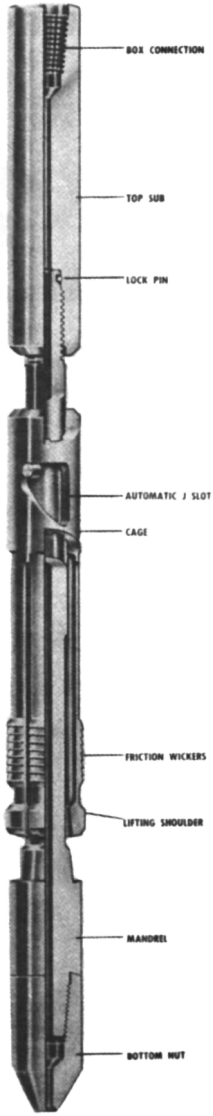
The BOWEN SIMPLEX PACKER RETRIEVER is used to retrieve all types of "drillable" production packers from the well bore. Types and sizes of production packers recoverable with BOWEN SIMPLEX PACKER RETRIEVERS are listed in the Range Charts in the following pages.

CONSTRUCTION

The BOWEN SIMPLEX PACKER RETRIEVER consists of Top Sub, Lock Pin, Cage, Mandrel and Bottom Nut. The Top Sub connects the Retriever to a Stinger or extension. The Cage is installed on the Mandrel which is threaded into the Top Sub and secured at assembly with the Lock Pin. The Bottom Nut is a bull-nose type and is furnished with the tool unless an alternate is specified. It may be removed so that a tool or other type nut may be run below the Retriever if required.

The Cage has two automatic "J" slots with internal lug keyways, friction wickers, lifting shoulder, and a tapered I.D. at the bottom with milled slots so that the lifting shoulder can expand. The Mandrel has two "J" slot lugs and a tapered cone which makes the Cage lifting shoulder expand.

The Retriever also has a small bore for high velocity jetting in case the packer has been sanded over.



BOWEN SIMPLEX PACKER RETRIEVER

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BOWEN SIMPLEX PACKER RETRIEVER
STRENGTH DATA

Retriever Assembly Number	Tensile Strength In Pounds *	Retriever Assembly Number	Tensile Strength In Pounds *
69035	67,000	69050	213,300
69040	70,600	69055	349,250
69045	119,500		

* The strengths shown are theoretical calculations based on yield strength of the material used in each case. The strengths shown are therefore accurate, plus or minus 20% of the figures shown, only. These figures do not constitute a guarantee, actual or implied; they are meant to serve as a guide only, and appropriate allowance must be made in use, as a safety factor.

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BOWEN SIMPLEX PACKER RETRIEVER

Catch Size Packer I.D.	1.968									2.375					
Extra Part To Catch		2.000	2.188	2.262	2.312	2.375	2.390	2.468	2.500		2.390	2.437	2.468	2.500	
Outside Diameter	1-13/16									2-1/4					
Inside Diameter	1/4									3/8					
Box Connection	1-13/16 Wilson F.J.									1-13/16 Wilson F.J.					
Complete Part No.	69035									69040		79079			
Assembly Weight.	14									20					

Catch Size Packer I.D.								2.688							
Extra Part To Catch	2.550	2.635	2.688	2.750	2.812	2.866	3.000		2.750	2.812	2.875	3.000	3.062	3.109	
Outside Diameter								2-9/16							
Inside Diameter								1/2							
Box Connection								2-3/8 Wilson F.J.							
Complete Part No.						78349		69045							
Assembly Weight								23			70770				

Catch Size Packer I.D.			3.250		3.810			3.875			4.250		4.500		
Extra Part To Catch	3.250	3.500		3.500		3.875	4.000		4.000	4.187		4.400		4.750	5.000
Outside Diameter			3-1/8					3-3/4							
Inside Diameter			5/8					3/4							
Box Connection			2-3/8 Reg.					2-7/8 Reg.							
Complete Part No.			69050					69055							
Assembly Weight			28	72205				35			73687		73688		

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BOWEN PACKER RETRIEVERS

(PATENTED)

GENERAL DESCRIPTION

The BOWEN PACKER RETRIEVER is an internally engaging fishing tool especia designed for the retrieving of "drillable" ty production packers. With its accesso components (Stinger, Bushing and Mill Sho the BOWEN PACKER RETRIEVER passes through the bore of the packer, prevents loss the packer during milling and pulls the pacl after it has been milled over, all in one trip. necessary, the BOWEN PACKER RETRIEVER can be released and reset to catching positio all without coming out of the hole.

USE

The BOWEN PACKER RETRIEVER is used to retrieve all types of "drillable" production pacl from the well bore. Types and sizes o production packers recoverable with BOWE PACKER RETRIEVERS are listed in the Range Charts in the following pages.

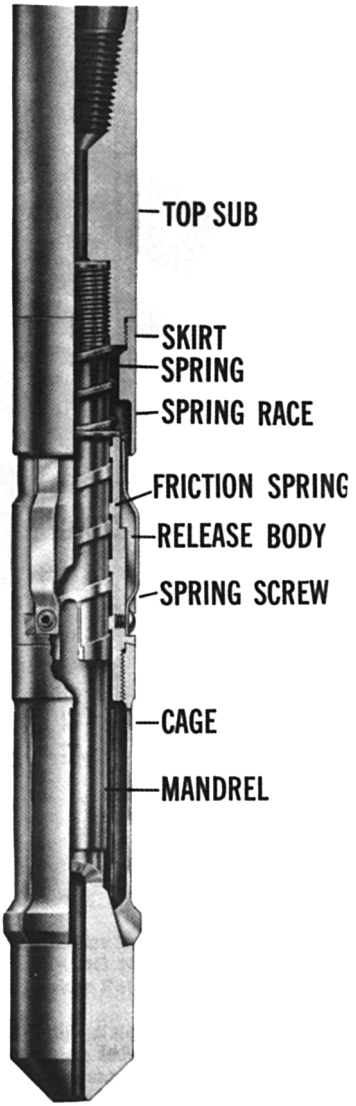
CONSTRUCTION

The BOWEN PACKER RETRIEVER consists essentially of a Top Sub, Mandrel, Cage, Ski Friction Springs, Balance Spring and Key. Th Top Sub connects the Packer Retriever to Stinger or extension. The Mandrel connects the Top Sub and contains a fast lead, squa thread upon which the skirt and Release Bo ride. The lower portion of the Mandrel has tapered cone which causes the Cage to expar to engage the packer. The Balance Sprin forces the Cage down on the Mandrel taper.

ACCESSORIES

STINGER

BOWEN PACKER RETRIEVER STINGERS are simple extensions that permit the Pack Retriever to be lowered completely through t packer during the milling operation.



BOWEN
PACKER RETRIEVER

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BOWEN PACKER RETRIEVER

Catch Size		1.968	...	2.468	...	...	...	...	...	...
(Packer I.D.)		To	...	To	...	2.688	...	...	•	•
	1.530	2.000	...	2.500	...	...	...	...	...	...
Optional Parts Will Catch		...	...	...	...	...	2.750	...	...	...
		...	2.262	...	2.688	...	To	3.000	3.250	3.500
		...	...	...	...	...	2.813	...	...	...
Tool O.D.	1.468	1-27/32	...	2-11/32	...	2-9/16	...	...	...	...
Cage O.D. Catch Position	1.713	2-1/8	...	2-11/16	...	2-7/8	...	...	...	...
I.D.	1/4"	1/4	...	3/8	...	1/2	...	...	...	...
Standard Box Connection	3/4	1-13/16	...	1-13/16	...	2-3/8	...	...	...	...
	S.R.	Wilson	...	Wilson	...	Wilson	...	...	...	...
	PIN	F.J.	...	F.J.	...	F.J.	...	...	...	...
Complete Part No.	27560	17690	...	17990	...	17590	...	...	...	...
Assembly Weight	16	20	...	23	...	28	...	...	...	...

Catch Size	...	...	...	...	...	...	...	...	...	...
(Packer I.D.)	3.250	...	•	•	3.875	...	...	•	.4.750	...
	...	...	...	...	...	...	...	...	...	...
Optional Parts Will Catch	...	...	...	...	...	...	...	...	...	...
	...	3.500	3.875	4.000	...	4.000	4.400	4.750	...	5.000
	...	...	...	...	...	...	...	...	...	...
Tool O.D.	3-1/8	...	...	...	3-3/4	...	...	...	4-9/16	...
Cage O.D. Catch Position	3-1/8	...	...	...	4-1/8	...	...	...	5-1/8	...
I.D.	3/8	...	...	...	3/4	...	...	...	1	...
Standard Box Connection	2-3/8	...	...	...	2-7/8	...	...	...	3-1/2	...
	API	...	...	...	API	...	...	...	API	...
	REG.	...	...	...	REG	...	...	...	REG.	...
Complete Part No.	17300	...	...	...	18150	...	...	...	18110	...
Assembly Weight	52	...	...	...	72	...	...	...	93	...

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STRENGTH DATA

Packer Retriever Assembly Number	Tensile Strength In Pounds *	Packer Retriever Assembly Number	Tensile Strength In Pounds *
27560	36,500	17300	241,500
17690	92,300	18150	493,000
17990	152,600	18110	719,000
17590	180,000		

*The strengths shown are theoretical These figures do not constitute a guarantee, calculations based on yield strength of theactual or implied; they are meant to serve as a material used in each case. The strengths guide only, and appropriate allowance must be shown are therefore accurate, plus or minus made in use, as a safety factor.
20% of the figures shown, only.

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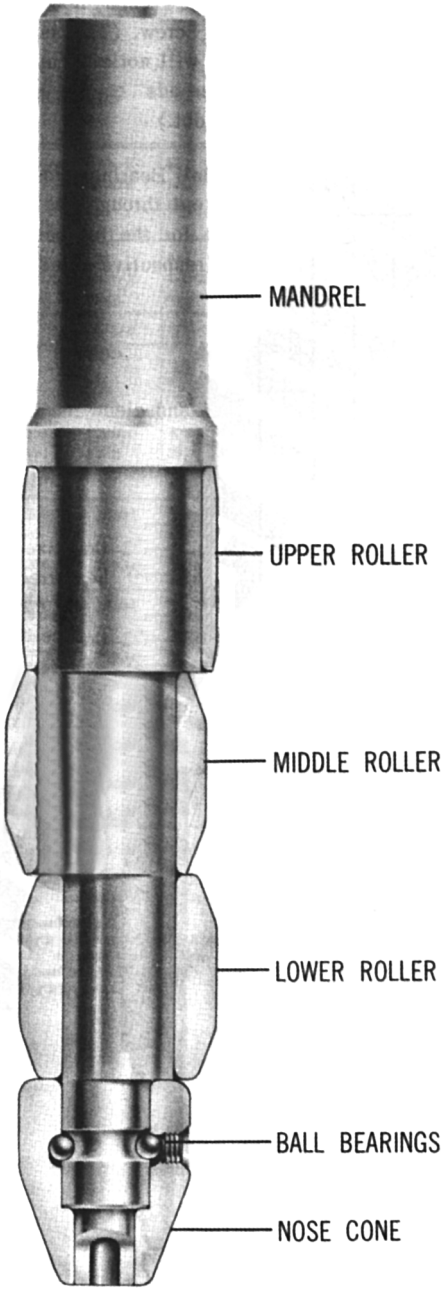
BOWEN TUBING AND CASING ROLLER



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BOWEN TUBING AND CASING ROLLERS

To Roll Casing Size	2-3/8 Tub.	2-7/8 Tub.	3-1/2 Tub.	4 3-1/2 L.P. 4 Tub.	4-1/2 4-3/4 5	5-1/2 5-3/4 6	6-5/8 7	7-5/8 8-5/8	9 9-5/8 10	10-3/4 11-3/4 12	13 13-3/8	16 18-5/8
Top Connection	I.D.S.S. Hardy Griffin	1-13/16 F.J.	API 1-1/4 Reg.	EUE 1-1/2	API 2-3/8 Reg.	API 2-7/8 Reg.	API 3-1/2 Reg.	API 4-1/2 Reg.	API 4-1/2 Reg.	API 6-5/8 Reg.	API 6-5/8 Reg.	6-5/8 Reg.
Circulation Hole	3/8	3/8	5/16	1/4	1/2	5/8	1	1-1/4	1-1/2	1-3/4	2	2
Length Of Individual Rollers	3	3	3	4	4	5	6	7	8	9	10	11
Complete Assembly Part No Weight	28802 11-1/4	26395 40	29046 22	28963 41-1/4	20660 60	20910 128	20920 171	20930 256	20940 392	20950 890	20960 1349	20970 1690

REPLACEMENT PARTS

Mandrel	Part No. Weight	28803 6	26396 22	29051 12	28964 26	20661 33	20911 68	20921 80	20931 116	20941 160	20951 600	20961 950	20971 1000
Nose Cone	Part No. Weight	28807 1	26400 3	29050 2-1/4	28965 3-1/4	20662 5-1/4	20912 6	20922 17	20932 30	20942 42	20952 60	20962 120	20972 340
Lower Roller	Part No. Weight	28806 1-3/4	26399 5	29049 2-13/16	28966 6-3/4	20663 9	20913 16	20923 28	20933 40	20943 80	20953 90	20963 160	20973 250
Middle Roller	Part No. Weight	28805 1-1/2	26398 4	29048 2-3/4	28967 4	20664 8	20914 16	20924 26	20934 40	20944 80	20954 90	20964 110	20974 250
Upper Roller	Part No. Weight	28804 1	26397 3	29047 2	28968 1-1/4	20665 5	20915 9	20925 20	20935 20	20945 30	20955 50	20965 105	20975 250
Ball Bearings	Part No. Weight No. Req'd	17294 1/16 9	17294 1/16 13	27940 1/16 8	20666 1/16 7	20666 1/16 9	20666 1/16 13	20926 1/8 15	20936 1/4 2	20936 1/4 16	20936 1/4 24	20966 1/2 21	20966 1/2 27
Loading Slot Set Screw	Part No. Weight	28808 1/16	26401 1/16	29052 1/16	20667 1/16	20667 1/16	20667 1/16	20927 1/8	20937 1/4	20937 1/4	20937 1/4	20967 1/2	20967 1/2

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BOWEN TUBING AND CASING ROLLERS - RANGE SHEET

Casing		Upper Roller			Middle Roller			Lower Roller			Nose Cone			Mean Casing Drift Dia. (Tool Rolls)
Size	Wt.	Part No.	O.D.	Wt.	Part No.	O.D.	Wt.	Part No.	O.D.	Wt.	Part No.	O.D.	Wt.	
2-3/8	4.6	28804	1.750	1	28805	1.938	1-1/2	28806	1.750	1-3/4	28807	1.562	1	1.901
2-7/8	6.4	26397	2.187	3	26398	2.360	4	26399	2.187	5	26400	1.875	3	2.347
3-1/2	7.7	29047	2.812	2	29048	2.674	2-3/4	29049	2.812	2-3/4	29050	2.437	2-1/4	2.943
4	9.5	28968	3.219	1-1/4	28967	3.281	4	28966	3.219	6-3/4	28965	2.875	3-1/4	3.423
4-1/2	9.5	20665	3.688	3-1/2	20664	3.875	7-1/2	20663	3.688	8	20662	3.125	5-1/4	4.032
	11.6					3.688	5-1/2							3.938
	13.6					3.526	4-1/2							3.859
4-3/4	15.75		3.688	3-1/2		3.875	7-1/4		3.688	8				4.032
5	11.5		4.250	7-1/2		4.250	10		4.250	12				4.500
	13.0					4.114	9							4.438
	15.0		4.000	5-1/2		4.192	9-1/2		4.000	10-1/2				4.343
	17.7					3.976	8							4.234
	18.0					3.965	8							4.218
	21.0		3.688	3-1/2		4.000	8		3.688	8				4.094
5-1/2	13.0	20915	4.662	9	20914	4.802	14	20913	4.662	16	20912	3.750	6	4.982
	14.0					4.738	14							4.950
	15.0					4.666	13							4.912
	15.5		4.609	9			13		4.609	16				4.888
	17.0					4.554	11							4.830
	20.0		4.359	6		4.574	11		4.359	13				4.716
	23.0					4.358	10							4.608
5-3.4	14.0		4.875	12		5.082	17		4.875	19				5.228
	17.0					4.894	15							5.128
	19.5		4.662	9		4.894	15		4.662	16				5.028
	22.5					4.694	14							4.928
6	15.0		5.125	15		5.300	20		5.125	22				5.462
	16.0					5.250	19							5.438
	18.0					5.100	18							5.362
	20.0					4.956	16							5.290
	23.0		4.875	12		4.982	17		4.875	19				5.178
6-5/8	17.0	20925	5.734	15	20924	5.910	24	20923	5.734	27	20922	5.000	17	6.072
	20.0					5.745	22							5.987
	22.0		5.609	13		5.745	22		5.609	25				5.927
	24.0					5.609	20							5.859
	26.0					5.478	18							5.793
	26.0					5.442	17							5.775
	28.0					5.350	16							5.729
	29.0		5.359	10		5.547	18		5.359	22				5.699
	32.0					5.375	16							5.613
7	17.0		6.250	24		6.202	29		6.250	36		5.500	22	6.476
	20.0					6.038	25							6.394
	22.0		6.000	20		6.164	26		6.000	32				6.336
	23.0					6.108	26							6.304
	24.0		6.000	20		6.048	25		6.000	32				6.274
	26.0		5.830	16		6.094	26		5.830	28				6.214
	28.0					5.970	25							6.152
	29.0					5.910	24							6.122
	30.0					5.854	23							6.092
	32.0		5.734	15		5.830	23		5,734	27		5.000	17	6.032
	35.0		5.609	13		5.776	22		5,609	25				5.942
	38.0					5.609	20							5.858
	40.00					5.442	17							5.774
7-5/8	20.0	20935	6.500	23	20934	6.875	42	20933	6.500	43	20932	5.375	30	7.062
	24.0					6.676	39							6.963
	26.4					6.562	37							6.906
	29.7		6.188	18		6.686	42		6.188	40				6.812
	33.7					6.468	35							6.703
	39.0					6.188	30							6.563

Continued on page 11-12

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BOWEN TUBING AND CASING ROLLERS - RANGE SHEET

Casing		Upper Roller			Middle Roller			Lower Roller			Nose Cone			Mean Casing Drift Dia. (Tool Rolls)
Size	Wt.	Part No.	O.D.	Wt.	Part No.	O.D.	Wt.	Part No.	O.D.	Wt.	Part No.	O.D.	Wt.	
8-5/8	24.0	20935	7.562	44	20934	7.758	62	20933	7.562	67	20932	6.500	48	8.035
	28.0					7.594	56							7.955
	32.0		7.375	39		7.594	56		7.375	62				7.859
	36.0					7.402	54							7.763
	38.0					7.302	52							7.713
	40.0		7.125	38		7.452	54		7.125	58		6.000	40	7.663
	43.0					7.304	52							7.589
	44.0					7.250	44							7.563
	49.0					7.024	45							7.449
9	34.00	20945	8.000	44	20944	7.676	50	20943	8.000	74	20942	6.625	42	8.212
	38.00		7.718	37		7.768	52		7.718	67				8.118
	40.00					7.676	50							8.072
	45.00		7.343	27		7.812	54		7.343	57				7.954
	55.00					7.375	43							7.734
9-5/8	29.30		8.500	58		8.720	82		8.500	88				8.985
	32.30					8.696	81							8.973
	36.00					8.438	75							8.843
	40.00		8.250	51		8.514	77		8.250	81				8.757
	43.00					8.354	70							8.677
	47.00		8.000	44		8.456	76		8.000	74				8.603
	53.50					8.164	63							8.457
10	33.00		8.812	70		9.050	91		8.812	100				9.306
10-3/4	32.75	20955	9.500	36	20954	9.728	78	20953	9.500	96	20952	8.250	60	10.114
	40.00					9.444	68							9.976
	40.50													9.972
	45.00					9.254	59							9.882
	45.50													9.872
	48.00					9.148	54							9.824
	51.00		9.250	27		9.294	60		9.250	87				9.772
	54.00					9.162	56							9.706
	55.50					9.114	50							9.682
11-3/4	38.0		10.250	36		10.896	122		10.250	128		8.750	80	11.072
	42.00					10.754	113							11.002
	47.00					10.594	108							10.922
	54.00					10.354	104							10.802
	60.00					10.138	95							10.694
12	40.00		10.750	90		10.862	120		10.750	150				11.306
13	40.00	20965	11.625	105	20964	11.846	118	20963	11.625	158	20962	10.00	120	12.360
	45.00					11.677	107							12.282
	50.00					11.534	100							12.204
	54.00					11.410	95							12.142
13-3/8	48.00		12.000	75		12.024	118		12.000	178				12.637
	54.50					11.812	117							12.537
	61.00					11.625	107							12.437
	68.00		11.625	105		11.812	102		11.625	158				12.337
	72.00					11.677	97							12.269
	83.00					11.320	93							12.097
	85.00					11.288	90							12.081
16	55.00	20975	14.500	146	20974	14.844	250	20973	14.500	284	20972	14.00	340	15.297
	65.00					14.554	234							15.172
	75.00					14.344	220							15.047
	84.00					14.114	210							14.932
18-5/8	78.00		17.000	325		17.304	440		17.000	463				17.777
	87.50					17.104	392							17.104
	96.50					16.904	370							17.577

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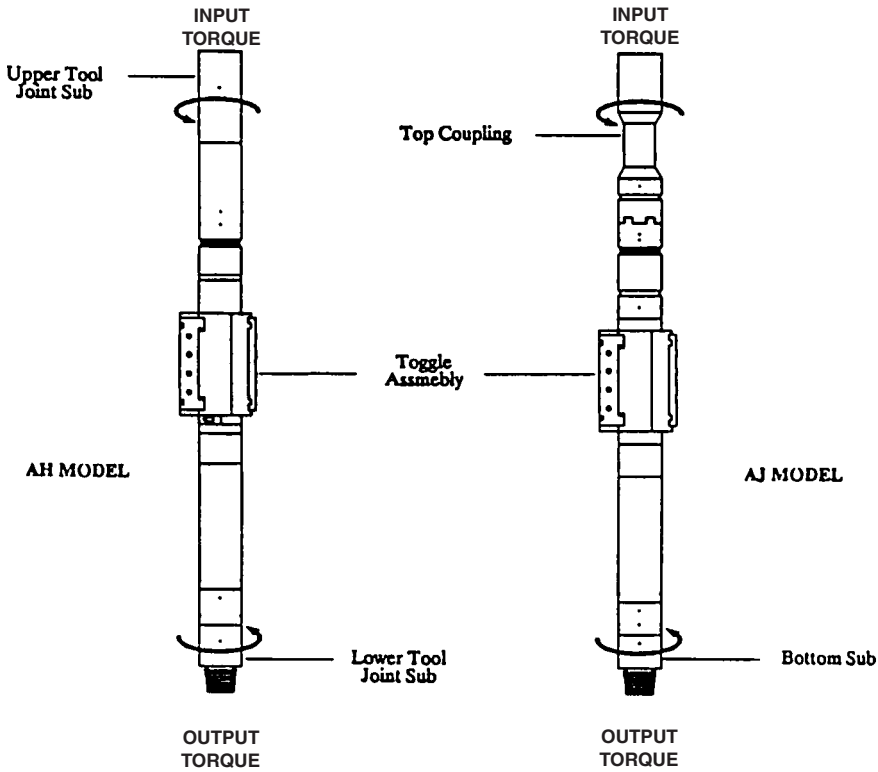
"AH & AJ"
REVERSING TOOLS

The AH and AJ Model Reversing Tools are used to unscrew sections of right-hand pipe and downhole equipment. Fig. 1 illustrates the external parts of these tools.

After the fish has been engaged, right-hand rotation at the (AH) Upper Tool Joint Sub or (AJ) Top Coupling will cause the Toggle Assembly to open and anchor in the well casing. The Toggle Assembly will adjust to the casing diameter up to its maximum capacity. When anchoring is accomplished, the (AH) Lower Tool Sub or (AJ) Bottom Sub will rotate left-hand by means of planetary gearing.

Maximum capacity of the Toggle Assembly can be changed in three ways: (1) by choice of Tool O.D., (2) by choice of length of carbide Points, and (3) the addition of Wing Extensions. The AH Model Tool is available in three O.D.'s: 4-1/16 inches, 5-13/16 inches, and 7-3/4 inches. Wing Extensions are available for the 6 inch and 8 inch in both Model Tools. See Table 3 for the minimum/maximum casing size for each Tool with each combination of Wing Extensions.

FIG. 1



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BACKOFF FISHING STRING

CASED HOLE FISHING

FIG. 2

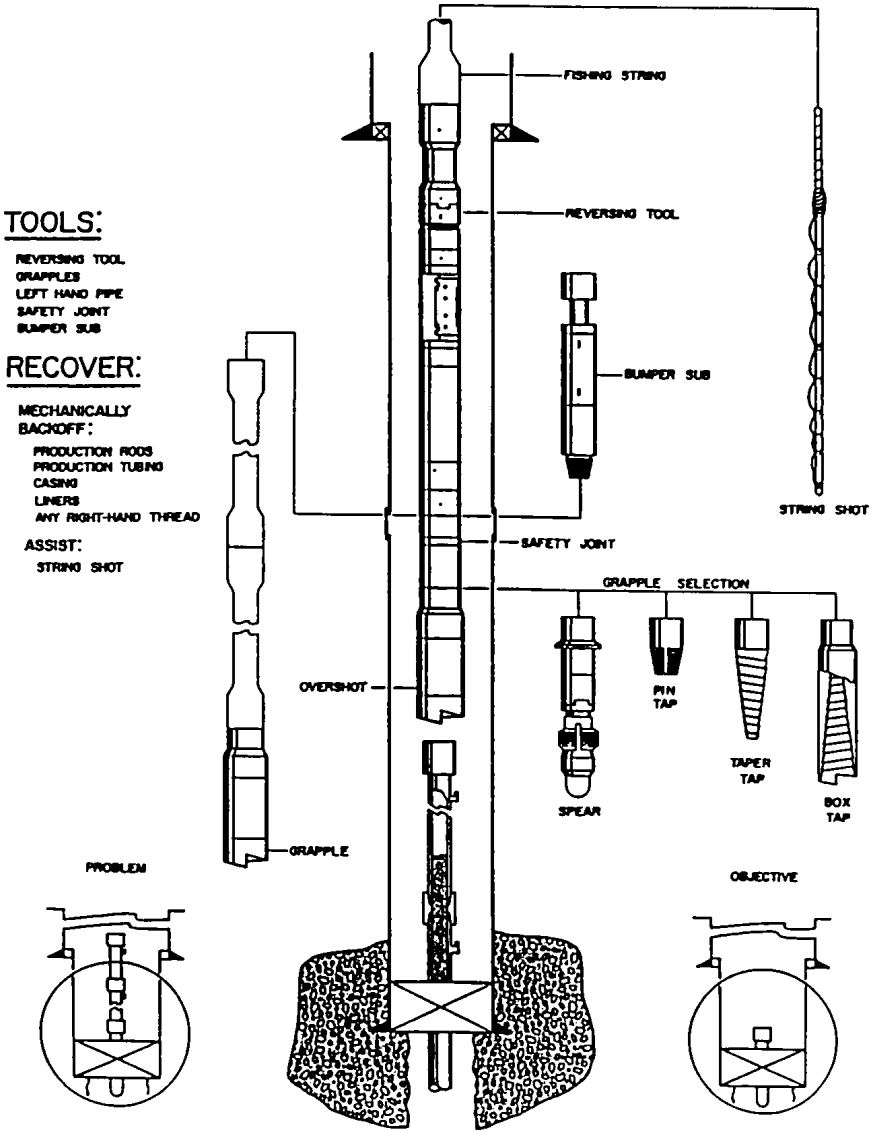

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TABLE I

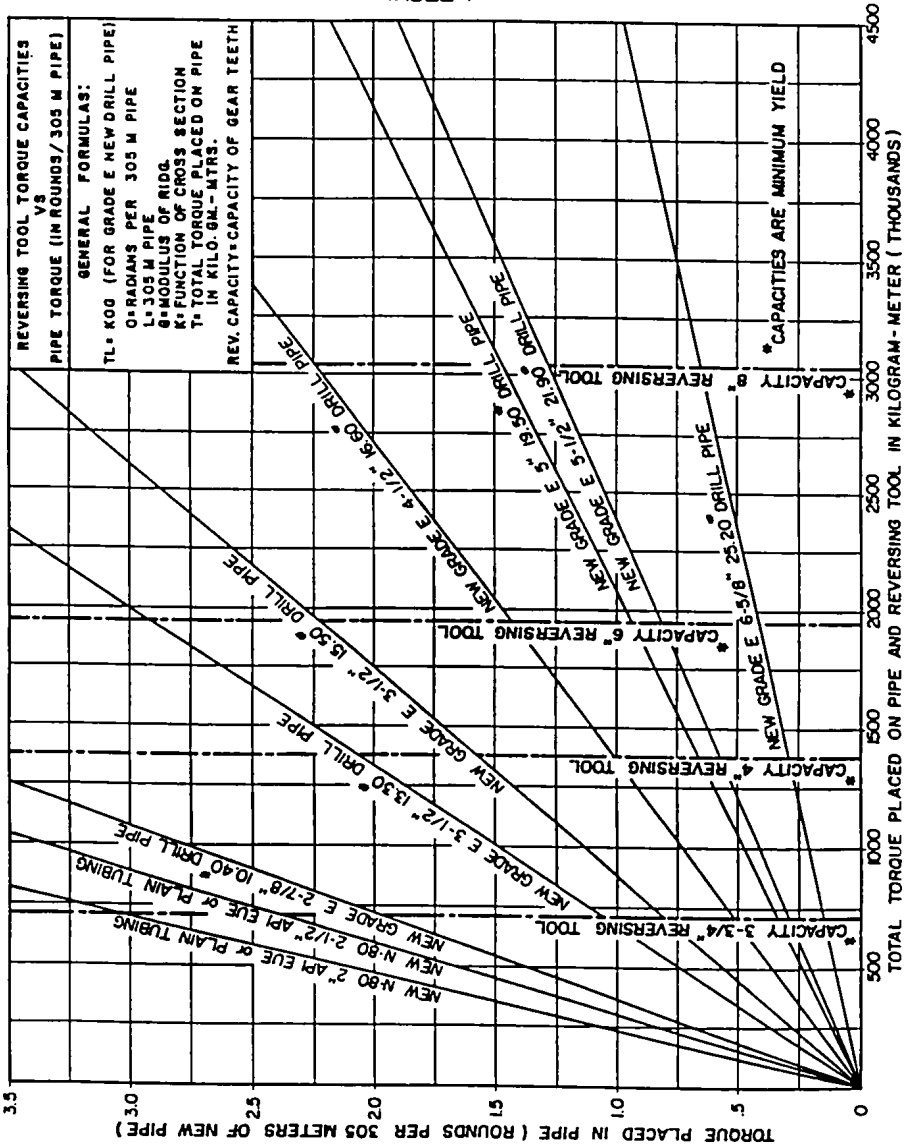
REVERSING TOOL TORQUE CAPACITIES VS PIPE TORQUE (IN ROUNDS/305 M PIPE)
GENERAL FORMULAS:
TL= KOD (FOR GRADE E NEW DRILL PIPE)
O=RADIANS PER 305 M PIPE
L=305 M PIPE
G=MODULUS OF RIDG.
K=FUNCTION OF CROSS SECTION
T=TOTAL TORQUE PLACED ON PIPE IN KILO.GM.-MTRS.
REV. CAPACITY=CAPACITY OF GEAR TEETH
NEW N-80 2" API EUE or PLAIN TUBING
NEW GRADE E 2-7/8" API EUE or PLAIN TUBING
NEW GRADE E 3-1/2" 13.30 # DRILL PIPE
NEW GRADE E 3-1/2" 15.50 # DRILL PIPE
NEW GRADE E 4-1/2" 16.60 # DRILL PIPE
NEW GRADE E 5" 19.50 # DRILL PIPE
NEW GRADE E 5-1/2" 21.90 # DRILL PIPE
NEW GRADE E 6-5/8" 25.20 # DRILL PIPE
*CAPACITY 3-3/4" REVERSING TOOL
*CAPACITY 4" REVERSING TOOL
*CAPACITY 6" REVERSING TOOL
*CAPACITY 8" REVERSING TOOL
*CAPACITIES ARE MINIMUM YIELD
TORQUE PLACED IN PIPE (ROUNDS PER 305 METERS OF NEW PIPE)
TOTAL TORQUE PLACED ON PIPE AND REVERSING TOOL IN KILOGRAM-METER (THOUSANDS)

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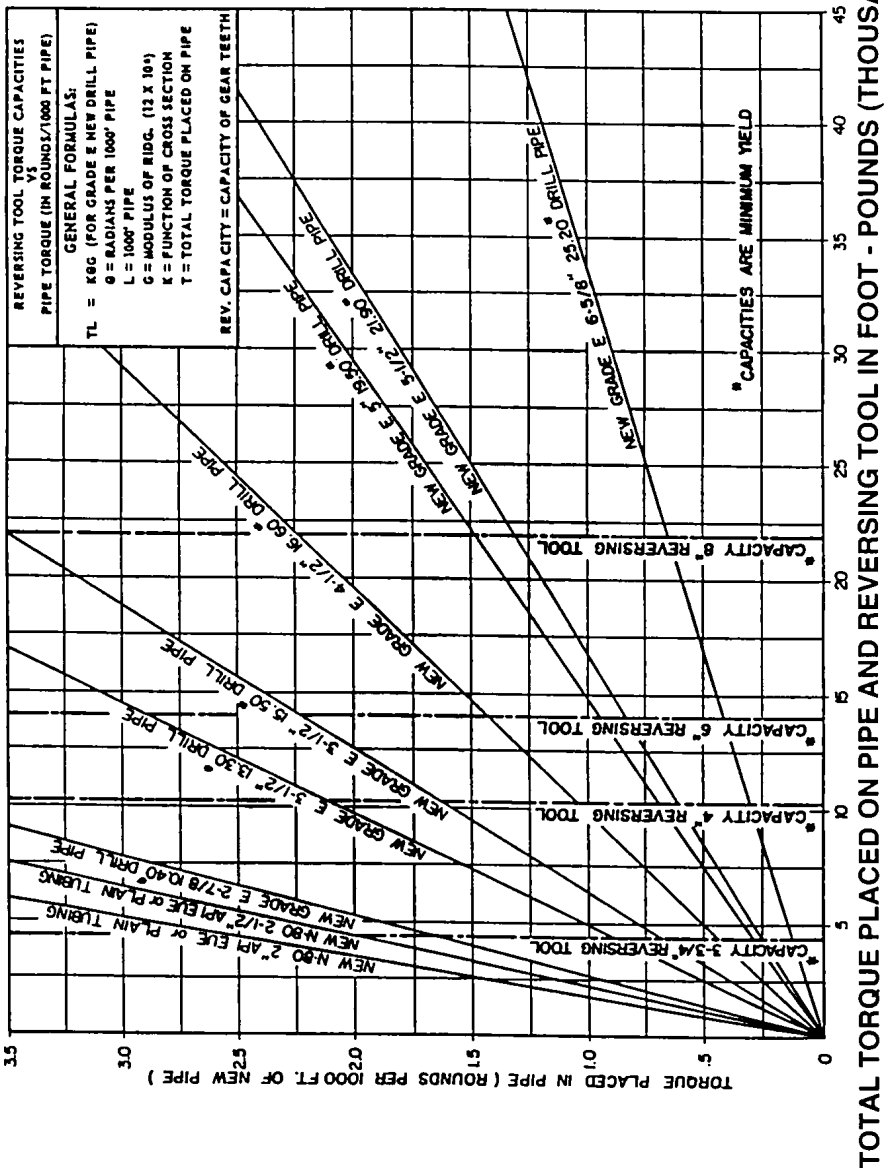
TABLE 2


REVERSING TOOL TORQUE CAPACITIES VS PIPE TORQUE (IN ROUNDS/1000 FT PIPE)
GENERAL FORMULAS:
TL = KθG (FOR GRADE E NEW DRILL PIPE)
θ = RADIANS PER 1000' PIPE
L = 1000' PIPE
G = MODULUS OF RIDG. (12 X 10⁶)
K = FUNCTION OF CROSS SECTION
T = TOTAL TORQUE PLACED ON PIPE
REV. CAPACITY = CAPACITY OF GEAR TEETH
TORQUE PLACED IN PIPE (ROUNDS PER 1000 FT. OF NEW PIPE)
TOTAL TORQUE PLACED ON PIPE AND REVERSING TOOL IN FOOT - POUNDS (THOUSANDS)
*CAPACITIES ARE MINIMUM YIELD
NEW GRADE E 6-5/8" 25.20 # DRILL PIPE
NEW GRADE E 5" 19.50 # DRILL PIPE
NEW GRADE E 5-1/2" 21.90 # DRILL PIPE
NEW GRADE E 4-1/2" 16.60 # DRILL PIPE
NEW GRADE E 3-1/2" 15.50 # DRILL PIPE
NEW GRADE E 3-1/2" 13.30 # DRILL PIPE
NEW GRADE E 2-7/8 10.40# DRILL PIPE
NEW N-80 2-1/2" API EUE or PLAIN TUBING
NEW N-80 2" API EUE or PLAIN TUBING
*CAPACITY 8" REVERSING TOOL
*CAPACITY 6" REVERSING TOOL
*CAPACITY 4" REVERSING TOOL
*CAPACITY 3-3/4" REVERSING TOOL

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AH AND AJ MODEL REVERSING TOOLS
WING CATCH DIAMETERS
TABLE 3

Tool Model		AJ	AH	AJ	AH	AJ	AH	AJ
Nominal Tool Size O.D.		3 in. **76.2 mm**	4 in. **101.6 mm**		6 in. **152.4 mm**		*8 in. **203.2 mm**	
Actual Tool O.D.		3-3/4 in. **95.3 mm**	4-1/16 in. **103.2 mm**		5-13/16 in. **147.6 mm**		7-3/4 in. **196.9 mm**	
Actual Tool I.D.		5/8 in. **17.5 mm**	1 in. **25 mm**	1-1/8 in. **28.6 mm**	1-1/8 in. **28.6 mm**		1-1/8 in. **28.6 mm**	
Tool Length		106 in. **2692.4 mm**	104 in. **2641.6mm**	116 in. **2946.4mm**	121 in. **3073.4 mm**	147 in. **3733.8 mm**	119 in. **3022.6mm**	157 in. **3987.8mm**
To Operate In Casing Size (Standard Wings)		4-1/2" - 11.60# thru 5-1/2" - 13#	5" - 18 # thru 7" - 40#		7" - 35# thru 8-5/8" A.W.		9" A.W. thru 10-3/4" A.W.	
To Operate In Casing Size - (Wing Extensions)**		NA	NA		9-5/8 A.W.		11-3/4 - 13-3/8" A.W. 15" - 16" A.W.	
Wing Catch Dia. (Std.)	Min. I.D. IN.	4"	4-1/4"		6"		8"	
	Max. I.D. IN.	5-1/4"	5-15/16"		8-1/8"		10-1/4"	
Wing Catch Dia. With Wing Extensions		NA	NA		Min. 8"		Min. - 10-1/2" Max. - 12-3/4"	
					Max. 9-1/16"		Min. - 13-3/4" Max. - 15-3/8"	
*** Backoff		1-1/4" thru 2-3/8" EUE Tubing	1-1/2" thru 3" Tube 2-3/8" thru 2-7/8" T.J.		2-7/8" thru 3-1/2" T.J. all size Tube and Casing		2-7/8" thru 5-1/2" T.J. all size Tube and Casing	

* Has 2 Sets of WIng Extensions (13-3/8" Csg. Max. and 16" Csg. Max.).

** New model tool Wing Extensions are integral. Old models are bolt-on.

*** Backoff of these listed tubes and connections is NOT GUARANTEED. Frequently work make-up torque of tool joints is beyond the capacity of the Reversing Tool. In all cases, a safe working capacity of the Reversing Tool must not be exceeded.

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AH AND AJ MODEL REVERSING TOOLS
GENERAL SPECIFICATIONS

TABLE 4

Tool Model (*Oldstyle Model)		*AJ	AJ	AH	AJ	AH	AJ	AH	AJ
Nominal Tool Size O.D.		3 in. **76.2 mm**		4 in. **101.6 mm**		6 in. **152.4 mm**		8 in **203.2 mm**	
Actual Tool O.D.		3-3/4 in. **95.3 mm**		4-1/16 in. **103.2 mm**		5-13/16 in. **147.6 mm**		7-3/4 in **196.9 mm**	
Actual Tool I.D.		5/8 in. **17.5 mm**		1 in. **25mm**	1-1/8 in **28.6 mm**	1-1/8 in **28.6 mm**		1-1/8 in. **28.6 mm**	
Maximum Yield Tensile Strength (Static)		90,000 lbs. **40,823 kg.**		150,000 lbs. **68,039 kg.**		200,000 lbs. **90,718 kg.**		400,000 lbs. **181,437 kg**.	
Pull Up Tensile Load For Rotary Righthand Release & RPM	lbs. **kg.**	20,000 - 50,000 **9,072 - 22,680**		50,000 **22,680**		60,000 - 80,000 **27,216 - 36,287**		Up To 100,000 **45,359**	
	RPM	90 - 100		100		120		120	
Maximum Yield Torque Load - see Torque vs. Rounds/Thousands For Various Pipe Sizes	Input	4,000 ft/lbs **5,952 kg/m**		10,000 ft/lbs. **14,880 kg/m**		14,000 ft/lbs. **20,832 kg/m**		22,000 ft/lbs. **32,736 kg/m**	
	Ratio	1-1.78							
	Output	7,120 ft/lbs **10,595 kg/m**		17,800 ft/lbs. **26,486 kg/m**		24,920 ft/lbs **37,081 kg/m**		39,160 ft/lbs **58,270 kg/m**	
Maximum Pump Pressure (Internal)		5,000 psi **352 kg/cm²**		5,000 psi **352 kg/cm²**		5,000 psi **352 kg/cm²**		5,000 psi **352 kg/cm²**	
Minimum Pump Pressure (To Lock Tool Static)		200 psi **14 kg/cm²**		150 psi **11 kg/cm²**		150 psi **11 kg/cm²**		150 psi **11 kg/cm²**	
Minimum Pump Pressure (To Lock Tool In Hole)		600 psi **42 kg/cm²**		500 psi **35 kg/cm²**		500 psi **35 kg/cm²**		500 psi **35 kg/cm²**	
Hole Size For Top & Bottom Circulating Plugs		1/4 in. **6.4 mm**		3/8 in **9.5 mm**		1/2 in. **12.7 mm**		5/8 in. **15.9 mm**	
Drop Ball O.D. (*Oldstyle Model)		*9/16 in. **14.3mm**	NA	1-1/16 in **27 mm**	NA	1-3/16 in. **30 mm**	NA	1-3/16 in. **30 mm**	NA

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AH AND AJ MODEL REVERSING TOOLS INPUT TO OUTPUT TORQUE CAPACITY RATIO AT VARIOUS TENSION LOADS AND STATIC LOAD CAPACITY

TABLE 5

Nominal Tool Size O.D.	Mechanical Ratio 0 lbs. (kg.) Tension	*Torque Mutiplication Ratio With Tension At			** Input Torque	Static Tensile Load Capacity (90% Yield)
		5,000 lbs. **22,680 kg.**	10,000 lbs. **45,359 kg.**	20,000 lbs. **90,718 kg.**		
3 in. **76.2 mm**	1 - 1.78	1- 1.60	1 - 1.40	1 - 1	4,000 ft/lbs. **5.952 kg/m**	90,000 lbs. **40,823 kg.**
4 in. **101.6 mm**	1 - 1.78	1- 1.60	1 - 1.40	1 - 1	10,000 ft/lbs. **14,880 kg/m**	150,000 lbs. **68,039 kg.**
6 in. **152.4 mm**	1 - 1.78	1- 1.60	1 - 1.40	1 - 1	14,000 ft/lbs. **20,832 kg/m**	200,000 lbs. **90,718 kg**.
8 in. **203.2 mm**	1 - 1.78	1- 1.60	1 - 1.40	1 - 1	22,000 ft/lbs. **32,736 kg/m**	400,000 lbs. **181,437 kg.**

Also See Table 6

* Torque Multiplication Ratio is gear teeth ratio. Actual Torque Ratio of input to output in ft/lbs. **(kg/m)** will depend on the well and operating conditions. Also, the torque ratio will always be less than theoretical ratio shown. Input

** This is Input Torque Yield Load. Always allow as much safety margin as possible. Input Torque is multiplied by the Reversing Tool according to the above table depending on tension taken on the Reversing Tool.

EXAMPLE: Output Torque of 3'' Reversing Tool with 4,000 ft/lbs **(5,952 kg/m)** Input Torque and under 5,000 lbs. **(22,680 kg)** Tension will be 1.60 x 4,000 **(5,952)** = 6,400 ft/lbs **(9,523 kg/m)** Output Torque. The same size tool with 0 lbs **(0 kg)** Tension and 4,000 ft/lbs **(5,952 kg/m)** Torque will be 1.78 x 4,000 **(5,952)** = 7,120 ft/lbs. **(10,595 kg/m)**.

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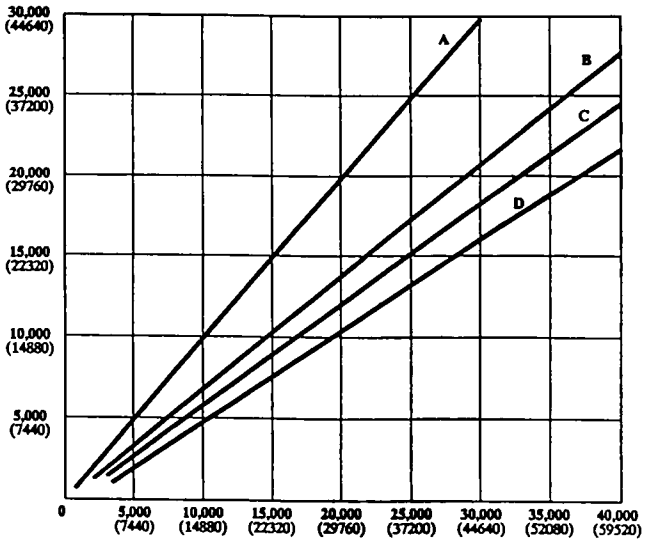
REVERSING TOOL TORQUE RATIO
INPUT TORQUE VS. OUTPUT TORQUE - ALL SIZES

TABLE 6

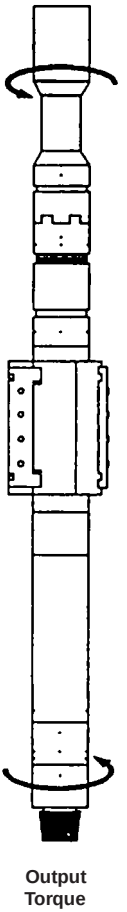
Reversing Tool Torque Input Ft-lbs. (Kg/m)



Reversing Tool Torque Output in Ft-lbs. (Kg/m)

Legend

A	20,000 Lbs. (9072 Kg) Tension
B	10,000 Lbs. (4536 Kg) Tension
C	5,000 Lbs. (2268 Kg) Tension
D	0 Lbs. (0 Kg) Tension



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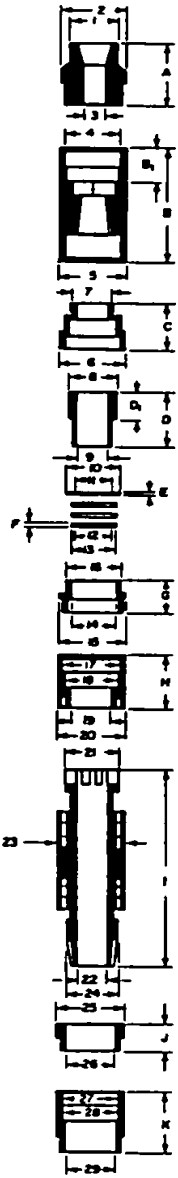
(AH) REVERSING TOOL FISHING DIMENSIONS

Part Name	Key	AH400 4" Reversing Tool	AH600 6" Reversing Tool	AH800 8" Reversing Tool
Top Sub	Part No. No. Pcs. A 1 2 3	AH459 1 11-1/4" 3-3/4" 4-1/16" 1-7/16"	AH659 1 16" 4-5/8" 5-3/4" 2-7/16"	AH859 1 16" 7-3/4" 7-5/8" 3"
Top Coupling	Part No. No. Pcs. B B_1 4 5	AH452 1 27-1/4" 8-5/8" 3-11/16" 4-1/16"	AH652 1 26-5/8" 8-1/8" 4-27/32" 5-3/4"	AH852 1 22-7/8" 9-3/8" 4-3/4" 7-5/8"
Adjusting Sleeve	Part No. No. Pcs. C 6 7	AH450 1 8-3/8" 4-1/16" 2-1/16"	AH650 1 10-1/8" 5-27/32" 2-27/32"	AH850 1 9-3/4" 7-5/8" 3-9/16"
Friction Sleeve	Part No. No. Pcs. D D1 8 9	AH445 1 7-3/4" 3-3/4" 2-7/8" 2-1/16"	AH645 1 10-1/2" 4-1/2" 3-15/16" 2-27/32"	AH845 1 10-3/8" 4-1/2" 5-3/16" 3-17/32"
Upper Friction Thrust Ring	Part No. No. Pcs. E 10 11	AH446 1 15/32" 3-11/16" 2-7/16"	AH646 1 7/8" 5-3/16" 3-7/16"	AH846 1 7/8" 6-15/16" 4-7/16"
Lower Friction Thrust Rings	Part No. No. Pcs. F 12 13	AH447 3 15/32" 2-7/16" 3-1/8"	AH647 3 7/8" 4-1/2" 3-7/16"	AH847 3 7/8" 6-1/8" 4-7/16"
Friction Packing Gland	Part No. No. Pcs. G 14 15 16	AH448 1 2-1/8" 3-3/16" 4-1/16" 3-23/32"	AH648 1 3-1/8" 4-9/16" 5-27/32" 5-3/16"	AH848 1 3-1/4" 6-3/16" 7-5/8" 6-15/16"
Internal Friction Gear	Part No. No. Pcs. H 17 18 19 20	AH438-440 3 5-15/32" 3-53/64" 3-37/64" 2-11/16" 4-1/16"	AH638 - 640 4 5-15/16" 5-19/64" 4-53/64" 3-13/16" 5-27/32"	AH838-840 4 6-1/8" 6-53/64" 6-25/64" 5-1/4" 7-5/8"
Toggle Sleeve	Part No. No. Pcs. I 21 22 23 24	AH432 1 25-15/16" 3-1/2" 2-3/32" 4-1/16" 3-1/4"	AH632 1 35-1/16" 4-13/16" 2-27/32" 5-11/16" 4-21/32"	AH832 1 35-17/32" 6-5/16" 3-9/16" 7-1/2" 5-7/8"



Continued on page 11-22

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(AH) REVERSING TOOL FISHING DIMENSIONS

Part Name	Key	AH 400 4" Reversing Tool	AH600 6" Reversing Tool	AH800 8" Reversing Tool
Grease Retainer Sleeve Packing Gland	Part No. No. Pcs. J 25 26	AH416 1 1-7/8" 4-1/16" 3-1/4"	AH616 1 1-3/4" 5-27/32" 4-1/64"	AH816 1 2-1/4" 7-5/8" 5-57/64"
Grease Retainer Sleeve	Part No. No. Pcs. K 27 28 29	AH415 1 6-3/16" 3-11/16" 3-11/16" 3-9/16"	AH615 1 6-7/8" 5-13/32" 5-13/32" 5-1/16"	AH815 1 7" 7-17/64" 7-1/32" 7"
Upper Gear Block	Part No. No. Pcs. L 30 31	AH409 1 7-7/8" 3-21/32" 3-17/32"	AH609 1 8-11/16" 5-5/16" 5-1/64"	AH809 1 8-7/8" 6-15/16" 6-7/16"
Lower Gear Block	Part No. No. Pcs. M 32 33	AH406 1 3-15/16" 3-1/2" 2-1/16"	AH606 1 4-5/16" 5-1/64" 3"	AH806 1 5-3/16" 6-7/16" 4"
Gear Body	Part No. No. Pcs. N 34 35 36	AH413 1 21-3/8" 3-3/4" 3-33/64" 4-1/16"	AH613 1 22-5/32" 5-21/64" 5-1/32" 5-13/16"	AH813 1 23-5/16" 7-17/64" 6-35/64" 7-5/8"
Lubricator Bod	Part No. No. Pcs. O 36	AH420 1 9-3/4" 4-1/16"	AH620 1 10-5/8" 5-3/4"	AH820 1 10-5/8" 7-5/8"
Lower Tool Joint Sub	Part No. No. Pcs. P 37 38	AH423 1 12-3/8" 1-1/4" 4-1/16"	AH623 1 14" 1-41/64" 5-3/4"	AH823 1 14" 1-41/64" 5-3/4"
Stem	Part No. No. Pcs. Q R 40 41 42 43 44	AH401 1 65-3/16" 16-1/4" 2-1/32" 1-1/8" 3" 1-1/2" 3"	AH601 1 77-1/8" 17-1/8" 2-25/32" 1-1/4" 4-1/16" 1-41/64" 4-9/32"	AH801 1 76-9/16" 17-5/16" 3-1/2" 1-1/4" 5-3/8" 1-41/64" 5-3/4"

NOTE: The above dimensions are to be used in the field as a guide in fishing for parts of the Reversing Tools that may become lost in the hole. They are not indicative of machine shop dimensions nor do they indicate in any manner the machine shop tolerances maintained in these tools. Dimensions are for standard Reversing Tools, and special O.D. Tools as ordered by the customerconstitute special dimensions that will not appear on this schedule.

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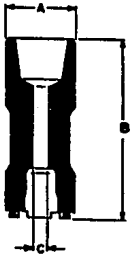
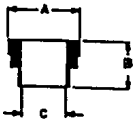
AJ MODEL REVERSING TOOL FISHING DIMENSIONS

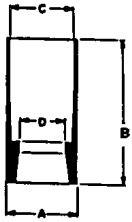
TOP COUPLING



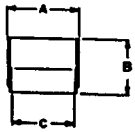
FRICTION SLEEVE



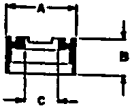
GEAR BODY



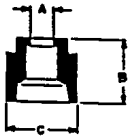
FRICTION SLEEVE HOUSING



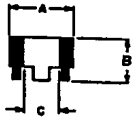
LOCK RING



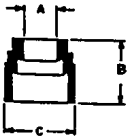
LUBRICATOR BODY



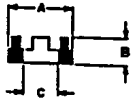
UPPER GEAR BLOCK



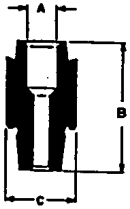
ADJUSTING SLEEVE



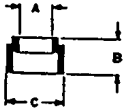
LOWER GEAR BLOCK



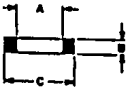
BOTTOM SUB



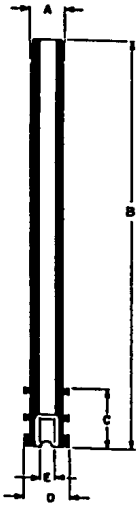
PACKING NUT



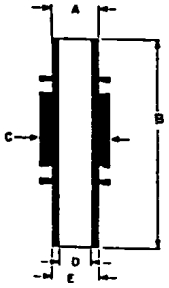
UPPER DOG RING



STEM



TOGGLE SLEEVE



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AJ MODEL REVERSING TOOL FISHING DIMENSIONS - INCHES

TOOL SIZE		OLD 3”	NEW 3”	4”	6”	8”
Top Coupling	A	3-3/4	3-3/4	4-1/16	5-13/16	7-3/4
	B	11	35	35	45	52-5/8
	C	5/8	5/8	1-1/8	1-1/4	2-1/2
Lock Ring	A	3-3/4	3-3/4	4-1/16	5-13/16	7-3/4
	B	2-5/8	5	6-3/4	10-5/8	10-7/8
	C	1.5	1.5	1.840	2.550	3.218
Adjusting Sleeve	A	1-25/32	1.780	2.050	2.801	3.5
	B	4	4-1/4	7	10-3/4	11-5/8
	C	3-3/4	3-3/4	4-1/16	5-13/16	7-3/4
Packing Nut	A	-	2.980	3.375	4-5/8	5.460
	B	-	3-1/4	3-7/16	3.125	6
	C	-	3-3/4	4-1/16	4.750	6.480
Upper Dog Ring	A	2-11/16	2.645	2.645	3.770	5.375
	B	1-1/2	7/8	1-1/2	1-1/2	1-3/4
	C	3-3/4	3-3/4	4-1/16	5-1/316	7-3/4
Toggle Sleeve	A	2-3/4	2.625	2.730	3.750	5.313
	B	26-11/16	23-15/32	30.687	38-5/8	40-17/32
	C	3-3/4	3-3/4	4-1/16	5-11/16	7-1/2
	D	1-25/32	1-13/16	2.062	2.843	3.5
	E	2.625	2.625	2.5	3.980	5.346
Friction Sleeve	A	3-3/4	3-3/4	4-1/16	5-13/16	7-3/4
	B	6-5/16	6-5/16	7-7/8	8-7/8	8-5/8
	C	2.645	2.645	2.750	4.020	5.395
Friction Sleeve Housing	A	-		4-1/6	5-13/16	7-3/4
	B	-		10-3/4	11-1/16	8-1/16
	C	-		3.525	5.040	6.5
Upper Gear Block	A	3.230	3.230	3.5	5.015	6.437
	B	4-5/8	4-5/8	7-3/16	6-15/16	8-13/16
	C	1.920	1.920	2.050	3	4
Lower Gear Block	A	3.230	3.230	3.5	5.015	6-7/16
	B	3-1/16	3-1/16	3.937	4-5/16	5-7/32
	C	1.920	1.920	2.063	3	4
Stem	A	1.730	1.730	1.813	2.962	3.440
	B	52-13/32	52-13/32	61-15/16	76-7/8	80-1/16
	C	9-9/32	9-9/32	7.5	7.625	7.625
	D	2-23/32	2-23/32	3	4.281	5.750
	E	5/8	5/8	1-1/8	1-1/4	1-1/4
Gear Body	A	3-3/4	3-3/4	4-1/16	5-13/16	7-3/4
	B	25-5/8	25-5/8	22-5/16	25-3/4	29-3/16
	C	3.5	3.5	3.520	5.031	6.550
	D	2-3/4	2-3/4	3-1/32	4-11/32	5-13/16
Lubricator Body	A	-	1.520	1.520	2.020	2.020
	B	-	12-7/16	12-3/4	14-5/8	16
	C	-	3-3/4	4-1/16	5-13/16	7-3/4
Bottom Sub	A	1.754	2	2	2-1/4	2-1/2
	B	18	22	22	24	26-1/4
	C	3-3/4	3-3/4	4-1/16	5-13/16	7-3/4

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SECTION 12

ROCK BITS - FLOATS

	Page
Comparison Chart	1 - 7
Tolerances and Make-up Torque	8 - 10
Casing Versus Bit Clearances	11 - 12
Grading	13
Cone Dimensions	14
Specifications	15
Drill Pipe Floats	16 - 17
2000 Drill Bit Classifier and Types of Drill Bits	18 - 69

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BIT COMPARISON CHART

MILL TOOTH BIT							
IADC CODE	HUGHES	KING DREAM	RBI	REED	SECURITY DBS	SMITH	VAREL
111S	R1	W111		Y11	XN1	DSJ	L111
114S	GTX-1	GA114					ETR1
115S	GTS-G1 MX-1 MAXGT-1	GA115 GAT115		MS11G EMS11G	XT1S XL1N	MSDSH MSDSSH MSDSHOD	ETR1G
116S	GT-1	H116	SS1	HP11 EHT11 PMC		FDS FDS+ FDSS+	
117S	GT-G1H GT-G1 STR-1 STX-1 XLX-1 MX-1	H117 HAT117	SS1LRG	PMC MHP11G	XS1S XSC1S XL1 XLC1 XLC1N	MFDSH MFDSSH MFDSHOD FDS+2 XR+	ETD1G
121S		W121		Y12		DTJ	L121
124S							L124
125S		GA125					ETD125 ETR2G
126S		H126	SS2	HP12 EHT12		FDT	L126 ETD2
127S	GT-G1H GT-G1 STR-1	H127 HAT127 HAT127L FAT127 FAT127L	SS2LRG	PMC	XS2SC		L127 ETD2G
131S	R3	W131		Y13	XN3	DGJ	L131
134S	GTX-3	GA134					L134
135S	GTX-G3 MX-3	GA135		MS13G EMS13G	XT3S	SDGH MSDGH MSDGHOD	L135 ETR3G ETR3GHS
136S		H136 HA136		HP13		FDG	L136
137S	MS-3	H137 HA137 HAT137		HP13G MHP13G	XS3S XL3 XL3N	FDGH MFDGH MFDGHOD	L137
211S					XN4		L211
214S		GA214					L214
215S		GA215		MS21G	XT4S	SVH MSVH	L215
216S	ATJ-4	H216		HP21		FV	ETD4

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BIT COMPARISON CHART

MILL TOOTH BIT

IADC CODE	HUGHES	KING DREAM	RBI	REED	SECURITY DBS	SMITH	VAREL
217S	ATJ-G4	H217		HP21G	XS4S XL4	FVH	
221S	DR5						
231S							L231
234S							L234
235S							L235
236S							L236
311S					XN5		L311
314S							L314
315S							L315
316S							L316
321S	R7	W321					L321
347S	ATJ-G8						

BIT COMPARISON CHART

INSERT BIT

IADC CODE	HUGHES	KING DREAM	NEW TECH	RBI	REED	SECURITY DBS	SMITH	VAREL
415X	GTX-00 GTX-03 GTX-03H MX-00 MX-03	G415 GA415 GAT415		C01	EMS41H	XT02S XT02DS XT04S XT04DS	MO1S M01SOD M02S M02SOD 02M	ETR04
417X	GT-00 GT-03 H-03 MX-00 MX-03 STR-03	H417 HA417 HAT417	NT01	C02 C05 C08	EHP41H EHP41A HP41H HP41A	XS00S XS00DS XS02S XS02DS XL02 XL02D XS04S XL04 XL04D	02MF	ETD04
417Y				C07		XS01S XS01DS XS03S XS03DS XS05S XS05DS		
425X					EMS42H	XT06 XT06DS XT08S XT08DS	M05S 05M 05MD	

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BIT COMPARISON CHART

INSERT BIT

IADC CODE	HUGHES	KING DREAM	NEW TECH	RBI	REED	SECURITY DBS	SMITH	VAREL
425Y	GTX-03C							
427X		HA427Y	NT05C NT09C	C1		XS06S XS06DS XT06D XS08S XS08DS	F05 05MF 05MFD	ETD09
427Y	GT-09C H-09C H-05C H-05CB MX-09C MX-09CG STR-05C	HJ427Y				XS07S XS07DS XS09S XS09DS	F07	
435X	GTX-09 GTX-09H GTX-11 GTX-11H MAXGT-09 MX-09 MX-09H	G435 GA435 GAT435			MS43A EMS43A	XT08S XT08DS XT12S XT12DS	M1S M1S0D 10M 10MD 12M 12MD 12MY	ETR14
437X	GT-09 H-09 MX-09 MX-09G MX-09H STR-09 STX-09	H437 H437E H437L HA437 HT437 HD437 HA437L HAT437 HAD437	NT12X	C15	HP43A HP43AM EHP43A EHP43H	XS10S XS10DS XS12X XS12DS XT12 XL12DSD XL12SD	F10T MF1 F10D MF10D 10MF 10MFD F12T 12MF 12MFD 12MFY F14T XR10T	ETD13 ETD14
437Y	STR-09C	HJ437			HP43 HP43M EHP43	XS11S XS13S XS13DS	12MFY	
445X	MAXGT-18 MX-18				EMS44H EMS11A	XT14S XT14DS XT16S XT16DS	M15S M15SD M15SOD 15M 15MD	ETR18
447X	GT-18 H-18 STR-18 STX-18 H-18H MX-18 MX-18H	H447 HA447 HAT447 HA447Y FA447 FA447L		C18R C18H		XS14S XS14DS XS16S XS16DS XSD16DS XL16 XL16D XLD16DN	F15 F15D F15OD MA15 MF15 MF15D MF15OD 15MF 15MFD XR15T	

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BIT COMPARISON CHART

INSERT BIT								
IADC CODE	HUGHES	KING DREAM	NEW TECH	RBI	REED	SECURITY DBS	SMITH	VAREL
447Y	H-18C GT-18C MX-09CG	HJ447Y	NT11C	C17 C17H C17R	HP44 HP44M EHP44	XS15S XS15DS XS17S XS17DS XL17	F12Y	ETD15
515X	GTX-20 GTX-20G GTX-20H MX-20	G515 GA515 GAT515			MS51A EMS51A EMS51H	XT18S XT18DS XT20S XT20DS XL20 XL20D XT22S XT22DS	A1JSL MA1SL 2JS M2S M2SD 20M/D	V515 ETR18 ETR24
517X	H-20 GT-20 STR-20 GT-20S HX-20 MX-20 MX-20G MX-20H STX-20	H517 HT517 H517E H517L HA517 HA517Y HA517G HA517L HAT517 HAD517 HB517	NT15X NT15F NT15XS NT2	C2 C2H C2R	HP51A HP51AM HP51X HP51XM HP51H HP51HM EHP51A EHP51X EHP51H	XS18S XS20S XS122S XS18DS XS20DS XS22DS SL20 XL20SD	F15H F2H F2H MF2 MF2D 20MF/D F15HT XR20T	ETD17 ETD18 ETD24
517Y	MX-20C	HJ517	NT17		HP51 EHP51	XS19S XS21S XS23S XS19DS XS21DS XS23DS	F17	ETD23 ETD25
525Y	GTX-20C						M27S M27SD	
527X	H-28 GT-28 HX-28 MX-28	H527 HA527 HAT527 HA527Y		C26	HP52A HP52X	XS24S XS26S XL26	F26 ERS754	V527B ETD28
527Y	GT-20C H-20C GT-28C HX-20C		NT2C NT27I NT27H	C27 C27H C27I	HP52M HP52	XS25S XS27S	F27 F27I MF27 MF27D XR20TY	ETD527CB ETD527C ETD27 ETD29
535X	MX-30H	G535 GA535			MS53A EMS53A MS53	XT28S XT30S XT30DS	3JS M35 M3S0D	ETD535 ETR34

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BIT COMPARISON CHART

INSERT BIT

IADC CODE	HUGHES	KING DREAM	NEW TECH	RBI	REED	SECURITY DBS	SMITH	VAREL
537X	H-30 GT-30 STR-30 GT-35 STX-30 GT-30H HX-30 MX-30 MX-30G MX-30H	H537 H537L HA537 HA537GL HAT537	NT3 NT3H	C3 C25 C3H C34	HP53A HP53AM EHP53A	XS28S XS30S XS30DS XL30 XL30D XS32S	F3 MF3 MF3D F3H MF3H MF30D F30 XR30T	ETD537 ETD34 ETD34D ETD34DD
537Y				C33A	HP53 EHP53 HP53JA	XS29S XS31S XSD31D XL31 XL31N XS33S XL33N		ETD35 ETD537C
545X						XT36S		
545Y	GTX-30C							
547X		HA547Y				XS34S XS36S XS38S	F35 F35A	
547Y	ATJ-33C GT-30C GTX-30C STR-30C STR-35C STX-30C H-30C H-30CG HR-38C HR-30C HR-38CH MX-35CG	HJ547Y HJT547GH	NT35CX NT3C	C37	HP54	XS35S XS37S XS39S	F37 MF37 F37A F37D MF37D XR30TY F37H	ETD37 ETD39
612X	G44	K612						
615X		G615				XT42	4JS	ETR44
617X	STX-40 STR-40FD ATJ-44 STR-40 ATJ-44G ATJ-44A HR-40	H617	NT4 NT4AX NT45	C4 C45 C4H	HP61A EHP61A	XS40S XS42S XS42DS XL42 XL42D XS44S	F4 F4H F4A F45A F45H XR40	ETD617 ETD44 ETD44D ETD44MS
617Y		HA617GL			HP61 EHP61	XS41S XS43S XS43D XSD43D XT43 XL43N XTD43D XS45S		V617C

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BIT COMPARISON CHART

INSERT BIT

IADC CODE	HUGHES	KING DREAM	NEW TECH	RBI	REED	SECURITY DBS	SMITH	VAREL
625X	GTX-40C				MS62	XT48 XT50D	5JS 47JS	ETD625 ETR48
627X				C5	HP62A EHP62A	XS46S XS48S XS48DS XS50S	F5 F5OD MF5 MF5D	ETD627 ETD48 ETD48MS
627Y	ATJ-44C STR-40C STR-44C STR-40CG STX-44C HR-44C HR-44CH MX-40CG MX-40C		NT4C NT47	C47 C47H C44 C44R	EHP62 HP62 HP62JA	XS47S XS49S XS49DS XS51S	F47H F47/A XR40Y XR40YDD	ETD627C ETD45 ETD47
632Y	G55							
635X					EMS63			
637X	ATJ-55R ATJ-55RG ATJ-55RD ATJ-55A STR-50 STR-50R STR-50FDX	H637	NT5RX			XS52S XS54S XS54DS XS56S XS58S		
637X	STX-50 HR-50 HR-55 HR-50R HR-50RG MX-50R MX-50RG							
637Y	ATJ-55	HJT637GH	NT5 NT5H	C54 C57 C5C	HP63 EHP63	XS53S XS55S XS55DS XSD55D XS57S XSD57D XS59S	F57 F57A F57D F57OD F57DD XR50Y	V637 ETD55
647X	HR-60 HR-66 STX-60FDX							
647Y	ATJ-66		NT6AX	C6 C65	HP64	XS61S XS63S XS65S XS67S XS69S	F670D	ETD57

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BIT COMPARISON CHART

INSERT BIT								
IADC CODE	HUGHES	KING DREAM	NEW TECH	RBI	REED	SECURITY DBS	SMITH	VAREL
717Y						XS71S XS71DS XS73S XS75S		
727Y								V727
732Y		K732						
735Y								V735
737X	STR-70 STR-70FDX STX-70	H737						
737Y	ATJ-77	HJT737G HJT737GH	NT7	C7 C75	HP73 EHP73	XS77S XS79S XS79DS XS81S	F7 F7OD MF7 XR70	V737 ETD75
747X	HR-80 HR-88							
747Y	ATJ-88				HP74	XS83S XS85S XS87S XS89S		
817X							F80D F8DD XR80	
817Y				C8 C80H		XS91S XS91DS XSD91DS XS93S		
832Y		K832				XS95S XS97S		
837X		H837					F9 XR90	
837Y	ATJ-99 HR-90 HR-99 STX-90			C9 C9H	HP83 EHP83	XS99S		ETD95
842Y		K842						

"This chart shows the IADC code relationship amoung specific bit types. Bit classifications are general and are to be used only as a guideline. Consult manufacturer for additional information."

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API TOLERANCES FOR NEW ROLLER CONE ROCK BITS			
BIT SIZE NOMINAL API		TOLERANCES	
in	*mm*	*in*	*mm*
3 3/8 - 13 3/4	85.7 - 349.2	+1/32 - 0	+0.79 - 0
14 - 171/2	355.6 - 444.5	+1/16 - 0	+1.59 - 0
17 5/8 & larger	447.1 & larger	+3/32 - 0	+2.38 - 0

NOZZLE SIZES	
32s	
mm	Area
mm	
8	6.4
9	7.1
10	7.9
11	8.7
12	9.5
13	10.3
14	11.1
15	11.9
16	12.7
18	14.3
20	15.9
22	17.5
24	19
28	22.1

Common Roller Bit Sizes	
Size of Bit	
In. (mm)	Size of Bit,
In. (mm)	
33/4 (95.2)	91/2 (241.3)
37/8 (98.4)	97/8 (250.8)
43/4 (120.6)	105/8 (269.9)
57/8 (149.2)	11 (279.4)
6 (152.4)	121/4 (311.2)
61/8 (155.6)	131/2 (342.9)
61/4 (158.8)	143/4 (374.6)
61/2 (165.1)	16 (406.4)
63/4 (171.4)	171/2 (444.5)
77/8 (200.0)	20 (508.0)
81/8 (212.7)	22 (558.8)
81/2 (215.9)	24 (609.6)
83/4 (222.2)	26 (660.4)
	28 (711.2)

Common Fixed Cutter Bit Sizes	
Size of Bit	
In. (mm)	Size of Bit,
In. (mm)	
37/8 (98.4)	81/2 (215.9)
41/2 (114.3)	83/4 (222.2)
43/4 (120.6)	91/2 (241.3)
57/8 (149.2)	97/8 (250.8)
6 (152.4)	103/8 (269.9)
61/8 (155.6)	121/4 (311.2)
61/4 (158.8)	143/4 (374.6)
61/2 (165.1)	16 (406.4)
63/4 (171.4)	171/2 (444.5)
77/8 (200.0)	

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Recommended Make-up Torque Ranges for Roller Cone Drill Bits

Connection	Minimum Make-up torque Ft./lbs (N/m)	Maximum Make-up Torque Ft./lbs (N/m)
2 3/8 API REG	3000 (4100)	3500 (4700)
2 7/8 API REG	4500 (6100)	5500 (7400)
3 1/2 API REG	7000 (9500)	9000 (12200)
4 1/2 API REG	12000 (16300)	16000 (21700)
6 3/4 API REG	28000 (38000)	32000 (43000)
7 5/8 API REG	34000 (46000)	40000 (54000)
8 5/8 API REG	40000 (54000)	60000 (81000)

Tables 32, 33, 34 & 35 taken from

API Recommended Practice 7G Sixteenth Edition, August 1998

Note:

Basis of calculations for recommended make-up torque assumed the use of a thread compound containing 40 to 60 percent by weight of finely powdered metallic zinc or 60 percent by weight of finely powdered metallic lead, with not more than 0.3 percent total active sulfur, applied thoroughly to all threads and shoulders (see the caution regarding the use of hazardous materials in Appendix G of API Specification 7). Due to the irregualr geometry of the ID bore in roller cone bits, torque valves are based on estimated cross-sectional areas and have been proven by field experience.

Common sizes for roller bits are listed in Table 34. Sizes other than those shown may be available in limited cutting structure types.

Common sizes for fixed cutter bits are listed in Table 35. Sizes other than those shown may be available in limited cutting structure types.

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Recommended Minimum Make-up Torques For Diamond Drill Bits

Connection	Maximum Pin ID	Bit Sub OD	Minimum Make-upTorque
	In. (mm)	In. (mm)	Ft./lb. (N.m)
23/8 API REG	1 (25.4)	3 (76.2)	1791* (2430)
		31/8 (79.3)	2419* (3280)
		31/4 (82.5)	3085* (4180)
27/8 API REG	11/4 (31.7)	31/2 (88.9)	3073* (4160)
		33/4 (95.2)	4617 (6260)
		37/8 (98.4)	4658 (6300)
31/2 API REG	11/2 (38.1)	41/8 (104.7)	5171* (7000)
		41/4 (107.9)	6306* (8500)
		41/2 (114.3)	7660 (10400)
41/2 API REG	21/4 (57.1)	51/2 (139.7)	12451* (16900)
		53/4 (146.0)	16476* (22300)
		6 (152.4)	17551 (23800)
		61/4 (158.7)	17757 (24000)
63/8 API REG	31/4 (82.5)	71/2 (190.5)	37100* (50300)
		73/4 (196.8)	37857 (51300)
		8 (203.2)	38193 (51800)
		81/4 (209.5)	38527 (52200)
75/8 API REG	31/4 (95.2)	81/2 (215.9)	48296* (65400)
		83/4 (222.2)	57704* (78200)
		9 (228.6)	59966 (81300)
		91/4 (234.9)	60430 (81900)
		91/2 (241.3)	60895 (82500)

*Note:

Torque figures followed by an asterisk indicate that the weaker member for the corresponding outside diameter (OD) and bore is the BOX. For all other torque valuethe weaker member is the PIN.

Basis of calculations for recommended make-up torque assumed the use of a thread compound containing 40 to 60 percent by weight of finely powdered metallic zincor 60 percent by weight of finely powdered metallic lead, with not more that 0.3 percent total active sulfur, applied thoroughly to all threads and shoulders (reference the CAUTION regarding the use of hazardous materials in Appendix G of API Specifications 7) and using the modified Screw Jack formula in A.8 and a unit stress of 50.000 psi in the box or pin, whichever is weaker.

Normal torque range is tabulated value plus 10 percent. Higher torque values may be used under extreme conditions.

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API CASING DATA, SHOWING BIT SIZES AND CLEARANCES

CASING SPECIFICATIONS								BIT SIZES AND DIAMETRAL CLEARANCE			
Casing Size OD (in.)	**mm**	Casing Coupling Dia OD (in.)	**mm**	Wt per Ft With Couplings (Lbs.)	**kg/m**	Inside Diameter of Casing (in.)	**mm**	Bit Size (in.)	**mm**	Clearance	
										Thou-sandths	Nearest 64th
4-1/2	**114.3**	5.000	**127.0**	9.50	**14.14**	4.090	**103.8**	3-7/8	**98.4**	.215	7/32
4-1/2	**114.3**	5.000	**127.0**	11.60	**17.26**	4.000	**101.6**	3-7/8	**98.4**	.125	1/8
4-1/2	**114.3**	5.000	**127.0**	13.50	**20.09**	3.920	**99.5**	3-3/4	**95.2**	.170	11/64
5	**127.0**	5.563	**141.3**	11.50	**17.11**	4.560	**115.8**	4-1/4	**108.0**	.310	5/16
5	**127.0**	5.563	**141.3**	13.00	**19.34**	4.494	**114.1**	4-1/4	**108.0**	.244	1/4
5	**127.0**	5.563	**141.3**	15.00	**22.32**	4.408	**111.9**	4-1/4	**108.0**	.158	5/32
5	**127.0**	5.563	**141.3**	18.00	**26.78**	4.276	**108.6**	4-1/8	**104.8**	.151	5/32
5-1/2	**139.7**	6.050	**153.6**	13.00	**19.34**	5.044	**128.1**	4-3/4	**120.6**	.294	19/64
5-1/2	**139.7**	6.050	**153.6**	14.00	**20.83**	5.012	**127.3**	4-3/4	**120.6**	.262	17/64
5-1/2	**139.7**	6.050	**153.6**	15.50	**23.06**	4.950	**125.7**	4-3/4	**120.6**	.200	13/64
5-1/2	**139.7**	6.050	**153.6**	17.00	**25.30**	4.892	**124.2**	4-3/4	**120.6**	.142	9/64
5-1/2	**139.7**	6.050	**153.6**	20.00	**29.76**	4.778	**121.3**	4-5/8	**117.5**	.153	5/32
5-1/2	**139.7**	6.050	**153.6**	23.00	**34.22**	4.670	**118.6**	4-1/2	**114.3**	.170	11/64
6	**152.4**	6.625	**168.2**	15.00	**22.32**	5.524	**140.3**	5-3/8	**136.5**	.149	5/32
6	**152.4**	6.625	**168.2**	18.00	**26.78**	5.424	**137.7**	5-1/8	**130.2**	.299	19/64
6	**152.4**	6.625	**168.2**	20.00	**29.76**	5.352	**135.9**	5-1/8	**130.2**	.227	15/64
6	**152.4**	6.625	**168.2**	23.00	**34.72**	5.240	**133.0**	5-1/8	**130.2**	.115	7/64
6-5/8	**168.3**	7.390	**187.7**	17.00	**25.30**	6.135	**155.8**	6	**152.4**	.135	9/64
6-5/8	**168.3**	7.390	**187.7**	20.00	**29.76**	6.049	**153.6**	5-7/8	**149.2**	.174	11/64
6-5/8	**168.3**	7.390	**187.7**	24.00	**35.71**	5.921	**150.3**	5-5/8	**142.9**	.296	19/64
6-5/8	**168.3**	7.390	**187.7**	28.00	**41.66**	5.791	**147.0**	5-5/8	**142.9**	.166	11/64
6-5/8	**168.3**	7.390	**187.7**	32.00	**47.62**	5.675	**144.1**	5-3/8	**136.5**	.300	19/64
7	**177.8**	7.656	**194.4**	17.00	**25.30**	6.538	**166.0**	6-1/4	**158.8**	.288	9/32
7	**177.8**	7.656	**194.4**	20.00	**29.76**	6.456	**163.9**	6-1/4	**158.8**	.206	13/64
7	**177.8**	7.656	**194.4**	23.00	**34.22**	6.366	**161.6**	6-1/4	**158.8**	.116	7/64
7	**177.8**	7.656	**194.4**	26.00	**38.69**	6.276	**159.4**	6-1/8	**155.6**	.151	5/32
7	**177.8**	7.656	**194.4**	29.00	**43.15**	6.184	**157.0**	6	**152.4**	.184	3/16
7	**177.8**	7.656	**194.4**	32.00	**47.62**	6.094	**154.7**	6	**152.4**	.094	3/32
7	**177.8**	7.656	**194.4**	35.00	**52.08**	6.004	**152.5**	5-7/8	**149.2**	.129	1/8
7	**177.8**	7.656	**194.4**	38.00	**56.54**	5.920	**150.3**	5-3/4	**146.0**	.170	11/64
7-5/8	**193.7**	8.500	**215.9**	20.00	**29.76**	7.125	**180.9**	6-3/4	**171.4**	.375	3/8
7-5/8	**193.7**	8.500	**215.9**	24.00	**35.71**	7.025	**178.4**	6-3/4	**171.4**	.275	9/32
7-5/8	**193.7**	8.500	**215.9**	26.40	**39.28**	6.969	**177.0**	6-3/4	**171.4**	.219	7/32
7-5/8	**193.7**	8.500	**215.9**	29.70	**44.19**	6.875	**174.6**	6-3/4	**171.4**	.125	1/8
7-5/8	**193.7**	8.500	**215.9**	33.70	**50.15**	6.765	**171.8**	6-5/8	**168.3**	.140	9/64
7-5/8	**193.7**	8.500	**215.9**	39.00	**58.03**	6.625	**168.2**	6-1/4	**158.8**	.375	3/8

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CASING SPECIFICATIONS								BIT SIZES AND DIAMETRAL CLEARANCE			
Casing Size OD (in.)	mm	Casing Coupling Dia OD (in.)	mm	Wt per Ft With Couplings (Lbs.)	kg/m	Inside Diameter of Casing (in.)	mm	Bit Size (in.)	mm	Clearance	
										Thou-sandths	Nearest 64th
8-5/8	**219.1**	9.625	**244.4**	24.00	**35.71**	8.097	**205.6**	7-7/8	**200.0**	.222	7/32
8-5/8	**219.1**	9.625	**244.4**	28.00	**41.66**	8.017	**203.6**	7-7/8	**200.0**	.142	9/64
8-5/8	**219.1**	9.625	**244.4**	32.00	**47.62**	7.921	**201.1**	7-5/8	**193.6**	.296	19/64
8-5/8	**219.1**	9.625	**244.4**	36.00	**53.57**	7.825	**198.7**	7-5/8	**193.6**	.200	13/64
8-5/8	**219.1**	9.625	**244.4**	40.00	**59.52**	7.725	**196.2**	7-5/8	**193.6**	.100	3/32
8-5/8	**219.1**	9.625	**244.4**	44.00	**65.47**	7.625	**193.6**	7-3/8	**187.3**	.250	1/4
8-5/8	**219.1**	9.625	**244.4**	49.00	**72.91**	7.511	**190.7**	7-3/8	**187.3**	.136	9/64
9-5/8	**244.5**	10.625	**269.8**	29.30	**43.60**	9.063	**230.2**	8-3/4	**222.2**	.313	5/16
9-5/8	**244.5**	10.625	**269.8**	32.30	**48.06**	9.001	**228.6**	8-3/4	**222.2**	.251	1/4
9-5/8	**244.5**	10.625	**269.8**	36.00	**53.57**	8.921	**226.5**	8-3/4	**222.2**	.171	11/64
9-5/8	**244.5**	10.625	**269.8**	40.00	**59.52**	8.835	**224.4**	8-5/8	**219.1**	.210	13/64
9-5/8	**244.5**	10.625	**269.8**	43.50	**64.73**	8.755	**222.3**	8-5/8	**219.1**	.130	1/8
9-5/8	**244.5**	10.625	**269.8**	47.00	**69.94**	8.861	**220.4**	8-1/2	**215.9**	.181	3/16
9-5/8	**244.5**	10.625	**269.8**	53.50	**79.61**	8.535	**216.7**	8-3/8	**212.7**	.160	5/32
10-3/4	**273.0**	11.750	**298.4**	32.75	**48.73**	10.192	**258.8**	9-7/8	**250.8**	.317	5/16
10-3/4	**273.0**	11.750	**298.4**	40.50	**60.26**	10.050	**255.2**	9-7/8	**250.8**	.175	11/64
10-3/4	**273.0**	11.750	**298.4**	45.50	**67.70**	9.950	**252.7**	9-3/4	**247.6**	.200	13/64
10-3/4	**273.0**	11.750	**298.4**	51.00	**75.89**	9.850	**250.1**	9-5/8	**244.5**	.225	7/32
10-3/4	**273.0**	11.750	**298.4**	55.50	**82.58**	9.760	**247.9**	9-5/8	**244.5**	.135	9/64
11-3/4	**298.4**	12.750	**323.8**	38.00	**56.54**	11.150	**283.2**	11	**279.4**	.150	5/32
11-3/4	**298.4**	12.750	**323.8**	42.00	**62.50**	11.084	**281.5**	10-3/4	**273.0**	.334	21/64
11-3/4	**298.4**	12.750	**323.8**	47.00	**69.94**	11.000	**279.4**	10-3/4	**273.0**	.250	1/4
11-3/4	**298.4**	12.750	**323.8**	54.00	**80.35**	10.880	**276.3**	10-5/8	**269.9**	.255	1/4
11-3/4	**298.4**	12.750	**323.8**	60.00	**89.28**	10.772	**273.6**	10-5/8	**269.9**	.147	6/64
13-3/8	**339.7**	14.375	**365.1**	48.00	**71.42**	12.715	**322.9**	12-1/4	**311.2**	.465	15/32
13-3/8	**339.7**	14.375	**365.1**	54.50	**81.10**	12.615	**320.4**	12-1/4	**311.2**	.365	25/64
13-3/8	**339.7**	14.375	**365.1**	61.00	**90.77**	12.515	**317.8**	12-1/4	**311.2**	.265	17/64
13-3/8	**339.7**	14.375	**365.1**	68.00	**101.18**	12.415	**315.3**	12-1/4	**311.2**	.165	11/64
13-3/8	**339.7**	14.375	**365.1**	72.00	**107.14**	12.347	**313.6**	12	**304.8**	.347	11/32
16	**406.4**	17.000	**431.8**	55.00	**81.84**	15.375	**390.5**	15	**381.0**	.375	3/8
16	**406.4**	17.000	**431.8**	65.00	**96.72**	15.250	**387.3**	15	**381.0**	.250	1/4
16	**406.4**	17.000	**431.8**	75.00	**111.60**	15.125	**384.1**	14-3/4	**374.6**	.375	3/8
16	**406.4**	17.000	**431.8**	84.00	**124.99**	15.010	**381.2**	14-3/4	**374.6**	.260	17/64
20	**508.0**	21.000	**533.4**	94.00	**139.87**	19.124	**485.7**	17-1/2	**444.5**	1.624	1-5/8

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HOW TO READ THE 4-CHARACTER I.A.D.C. CODE

Character 1: Formation Hardness
1 - 3: Tooth Bits
4 - 8: Insert Bits

Character 2: Hardness Within Class
Example: 1-1 is softer than 1-2

Character 3: Bearing Type
1. Standard Roller Bearing, No Seal
2. Roller Bearing, Air Cooled, No Seal
3. Roller Bearing, Gauge Protected, No Seal
4. Sealed Roller Bearing
5. Sealed Roller Bearing, Gauge Protected
6. Sealed Friction Bearing
7. Sealed Friction Bearing, Gauge Protected

Character 4: Addition Design Features
A) Air Application
B)
C) Center Jet
D) Deviation Control
E) Extended Jets
F)
G) Extra Gauge/Body Protection
H)
I)
J) Jet Deflection
K)
L)
M)
N)
O)
P)
Q)
R) Reinforced Welds
S) Standard Steel Tooth Model
T)
U)
V)
W)
X) Chisel Inserts
Y) Conical Inserts
Z) Other Insert Shapes

1 Journal bearing bits with air circulation nozzles
2 Full extension (welded tubes with nozzles) Partial extnsions hsould be noted elsewhers
3 For percussion applications
4 Steel tooth bits none of the extra features listed in this table

BIT RECORD DULL BIT GRADING COLUMNS

Cutting Structure				Bearings/ Seals	Gauge	Other Dull Char	Reason Pulled
Inner	Outer	Dull Char.	Location				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(1) INNER CUTTING STRUCTURE
Inner 2/3rds of bit

STEEL TOOTH BITS - A linear measure of lost tooth height.
0 - No loss of tooth height due to wear or breakage.
8 - Total loss of tooth height due to wear or breakage.

INSERT BITS - A linear measure of total cutting structure reduction due to lost, worn and/or broken insert.
0 - No loss, worn and/or broken inserts.
8 - Total reduction of cutting structure due to lost, worn and/or broken inserts.

(2) OUTER CUTTING STRUCTURE
Outer 1/3 of bit

FIXED CUTTER BITS - A linear measure of lost, worn and/or broken cutters.
0 - None lost, worn and/or broken.
8 - Total reduction of cutting structure due to lost, worn and/or broken cutters.

(3) Dull Characteristics
(Use only cutting structure dull codes)

*BC - Broken Cone
BT - Broken Teeth/Cutters
BU - Balled Up Bit
*CC - Cracked Cone
*CD - Cone Dragged
CI - Cone Interference
CR - Cored
CT - Chipped Teeth/Cutters
ER - Erosion
FC - Flat Crested Wear
HC - Heat Checking
JD - Junk Damage
*LC - Lost Cone
LN - Lost Nozzle
LT - Lost Teeth/Cutters
OC - Off-Center Wear
PB - Pinched Bit
PN - Plugged Nozzle/Flow Passage
RG - Rounded Gauge
RO - Ring Out
SD - Shirttail Damage
SS - Self Sharpening Wear
TR - Tracking
WO - Washed Out Bit
WT - Worn Teeth/Cutters

NO - No Other Dull Characteristic
* Show cone # or it's location (4)

(4) Location

Roller Cone	Cone # or #'s Roller Cone
N - Nose Row	1
M - Middle Row	2
H - Heel Row	3
A - All Rows	

Fixed Cutter
C - Cone
N - Nose
T - Taper
S - Shoulder
G - Gauge
A - All Areas

(5) Bearing/Seals
Non-Sealed Bearings - A linear scale estimating bearing life used. (0 - no life used, 8 - all life used, ie. no bearing life remaining)

Sealed Bearing
E - indicates seals effective
F - indicates seals failed
X - indicates fixed cutter (bearingless)

(6) Gauge
1-in gauge
1/16 - 1/16" out of gauge
2/16 - 1/8" out of gauge

(7) Other Dull Characteristics
(See column (3) codes)

(8) Reason Pulled
BHA - Change Bottom Hole Assembly
DMF - Downhole Motor Failure
DTF - Downhole Tool Failure
DSF - Drill String Failure
DST - Drill Stem Test
DP - Drill Plug
CM - Condition Mud
CP - Core Point
FM - Formation Change
HP - Hole Problem
HR - Hour on Bit
PP - Pump Pressure
LOG - Run Logs
PR - Penetration Rate
RIG - Rig Repair
TD - Total Depth/Casing Depth
TW - Twist Off
TQ - Torque
WC - Weather Conditions

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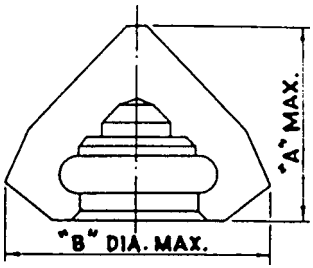
ROCK BIT CONE DIMENSIONS

2 CONE BITS		SIZE	3 CONE BITS	
A	B		A	B
		3-3/4 - 4-1/8	1-31/32	2-45/64
		4-1/4 - 4-1/2	2-13/64	2-59/64
		4-5/8 - 5	2-11/32	3-13/64
		5-1/8 - 5-1/2	2-41/64	3-17/64
		5-5/8 - 6	3-1/8	4-1/64
		6-1/8 - 6-1/2	3-7/64	4-3/16
		6-5/8 - 7	3-7/16	4-9/16
		7-1/8 - 7-1/2	3-45/64	4-27/32
3-45/64	5-17/32	7-5/8 - 8	3-31/32	5-17/64
4-11/32	6-7/64	8-1/8 - 8-1/2	4-3/8	5-25/32
4-11/32	6-5/16	8-5/8 - 9	4-17/32	6-1/32
		9-1/8 - 9-1/2	4-9/16	6-13/32
4-7/8	7	9-5/8 - 9-7/8	4-15/16	6-41/64
5-23/64	7-19/32	10-1/2 - 11-1/2	5-27/64	7-5/32
5-63/64	8-27/64	11-3/4 - 12-1/2	6-1/8	7-61/64
		12-5/8 - 13-1/8	6-5/16	8-31/64
		13-1/2 - 14-1/4	7-1/32	8-13/16
		14-1/2 - 15	7-25/64	9-19/32
		16	9-27/32	10-1/8
		17 - 17-1/2	8-13/64	11-11/64
		18-1/2 - 18-7/8	8-25/32	11-23/64
		20	9-1/2	11-7/8
		22	10-15/32	14-1/64
		24	10-15/16	14-9/16
		26	12-19/64	14-31/64



The Cone sizes shown are the nominal Hughes Tool Company "Cone Dimensions" and are the maximum for the size indicated in the middle column. They may be used as a guide in Junk Fishing Operations.

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DRILL BIT SPECIFICATIONS

Size (Inches)	Approx. Weight (Lbs.)	Reg. *API Pin Shank Size (Inches)	Size (Inches)	Approx. Weight (Lbs.)	Reg. *API Pin Shank Size (Inches)
3-3/4	10		8-3/8	67	
3-7/8	10		8-1/2	68	
4-1/8	11	2-3/8	8-5/8	73	4-1/2
4-1/4	11		8-3/4	74	
4-3/8	11		9	75	
4-1/2	11	2-3/8	9-1/2	102	4-1/2 / 6-5/8
4-5/8	16		9-5/8	112	Reg.
4-3/4	16	2-7/8	9-3/4	112	
4-7/8	16	2-7/8	9-7/8	112	5-1/2 / 6-5/8
5-1/8	25		10-5/8	140	5-1/2 / 6-5/8
5-3/8	25	3-1/2	11	145	6-5/8
5-5/8	25		11-3/4	170	
5-3/4	25		12	175	6-5/8
5-7/8	25		12-1/4	179	
6	28	3-1/2	13-3/4	245	6-5/8
6-1/8	28		14-3/4	300	6-5/8
6-1/4	28		15	300	
6-3/8	29		16	334	6-5/8
6-1/2	29	3-1/2	17	497	6-5/8
6-5/8	29		17-1/2	500	6-5/8
6-3/4	37		18-1/2	569	6-5/8
7	42		20	614	6-5/8
7-3/8	42	3-1/2		758	
7-1/2	56		22	1039	
7-5/8	57	4-1/2	23	1065	6-5/8
7-3/4	58		24	1165	or
7-7/8	59			1190	8-5/8
8-1/8	64		26	1225	

*Shank sizes shown are Regular API Tool Joint Pin threading.

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SPECIFICATION GUIDE BAKERLINE DRILL PIPE FLOATS AND VALVES

TOOL JOINT TYPES	SIZES									
	IR	IF-2R	2F-3R	3F	3-1/2 IF	4R	4F	5R	5F-6R	6F
API Regular	2-3/8	2-7/8	3-1/2			4-1/2		5-1/2 - 5-9/16*	6-5/8+	8-5/8
Hughes or Reed Acme Regular	2-3/8	2-7/8	3-1/2			4-1/2		5-1/2 - 5-9/16	6-5/8	
Union Tool	2-3/8	2-7/8 3-1/2					4-1/2	5-1/2 - 5-9/16*	6-5/8+	
Hughes or Reed Double Streamline	2-7/8	3-1/2	4	 4-1/2*		5	5-1/2 - 5-9/16*			
API Full Hole		2-3/8	2-7/8	3-1/2*	4		4-1/2*		5-1/2 - 5-9/16*	6-5/8*
Reed Acme Full Hole				3-1/2*			4-1/2*		5-1/2 - 5-9/16*	
Hughes Acme Streamline		2-3/8	2-7/8	3-1/2*			4-1/2*		5-1/2 - 5-9/16*	
Hughes Xtra Hole			2-7/8	3-1/2			4-1/2	5		
Reed Semi-Internal Flush				3-1/2			4-1/2			
API Internal Flush		2-3/8	2-7/8		3-1/2		4	4-1/2		
Hydril Type "IF" (Int. Flush Ext. Upset)		2-3/8*	2-7/8*	3-1/2*				4-1/2*	5	
Hydril "EIU" (Ext. Int. Upset)				3-1/2		4	4-1/2		5-1/2 - 5-9/16*	6-5/8
Hydril Type "F" (External Flush)	2-7/8 3-1/2*			4-1/2 5		5-1/2 - 5-9/16		6-5/8		
Hughes Ext. Flush Acme Type		3-1/2	4-1/2			5-1/2 - 5-9/16		6-5/8		
Hughes Ext. Flush Full Hole Type				4-1/2						

• Interchangeable
+ Interchangeable
* Float Body in these Sizes has smaller I.D. than Standard Tool Joint.
Grey area show sizes available in both Model "F" and Model "G". Sizes shown in white are available in Model "F" only.

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REPAIR KIT FOR BAKERLINE MODEL "F" DRILL PIPE FLOAT VALVE, PRODUCT NO. 480-13

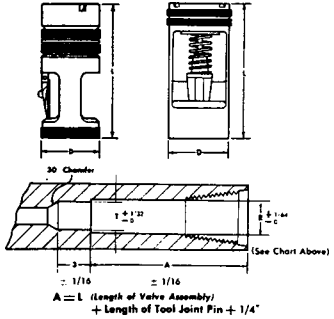
Size		1R	1F-2R	2F-3R	3F	3-1/2 IF	4R	4F	5R	5F-6R	6F
* Rubber Parts Kit	Comm. No	01-60122-00	01-60123-00	01-60124-00	01-60125-00	01-60126-00	01-60127-00	01-60128-00	01-60129-00	01-60130-00	01-60131-00
+ Metal Parts Kit	Comm. No	01-59298-00	01-60113-00	01-60114-00	01-60115-00	01-60115-00	01-60117-00	01-60118-00	01-60119-00	01-60120-00	01-60121-00

* A complete Kit consisting of eight Side Seals and two Valve Seals.
+ A complete Kit consisting of one Valve, One Valve Seal Disc one Valve Guide, and three Springs.
The same "Rubber" Parts Repair Kit" referred to above can also be used for Product No,. 480-18 - Model "FC" Automatic Fill Drill Pipe Float Valve.

REPAIR KIT FOR BAKERLINE MODEL "G" FULL-FLOW DRILL PIPE FLOAT VALVE, PRODUCT NO. 480-15

Size		2F-3R	3F	4R	4F	5R	5F-6R
* Rubber Parts Kit	Comm. No	01-60138-00	01-60139-00	01-60140-00	01-60141-00	01-60142-00	01-60143-00
+ Metal Parts Kit	Comm. No	01-60132-00	01-60133-00	01-60134-00	01-60135-00	01-60136-00	01-60137-00

* A complete Kit consisting of eight Side Seals, one Seal, and one Shock Absorber.
+ A complete Kit consisting of one Retaining Ring, One Flapper Valve, three Spring Assemblies, and three Hinge Pins.
The same "Rubber Parts Repair Kits" referred to above can also be used for the following products:
Product No. 480-16 - MODEL "GA" FULL-FLOW DRILL PIPE FLOAT VALVE WITH FILL-UP BEAN.
Product No. 480-17 - MODEL "GB" FULL-FLOW PIPE FLOAT VALVE.
Product No. 480-19 - MODEL "GC" Automatic Fill Drill Pipe Float Valve.



DIMENSIONAL DATA

Size Valve	D Diameter of Valve	R (D Plus 1/32) Diameter of Recess For Valve	L Length of Valve	T* Diameter of Recess for TOTCO Spider	Size Valve	D Diameter Of Valve	R (D Plus 1/32 Diameter of Recess for Valve	L Length Of Valve	T* Diameter of Recess for TOTCO Spider
1R	1-21/32	1-11/16	5-7/8	1-5/16	4R	3-15/32	3-1/2	8-5/16	2-15/16
1F-2R	1-29/32	1-15/16	6-1/4	1-1/2	4F	3-21/32	3-11/16	12	3-1/4
2F-3R	2-13/32	2-7/16	6-1/2	1-29/32	5R	3-7/8	3-29/32	9-3/4	3-3/8
3F	2-13/16	2-27/32	10	2-7/16	5F-6R	4-25/32	4-13/16	11-3/4	4-9/32
3-1/2 IF	3-1/8	3-5/32	10	2-11/16	6F	5-11/16	5-23/32	14-5/8	5-9/16

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2000 Drill Bit Classifier

World Oil offers this comprehensive listing of major and manufacturer's drilling bits to aid drilling supervisors and engineers in field selection. While this listing has been published annually for several years, changes from year to year are significant. Prior to ordering, users should consult the manufacturer to verify availability and specifications.

How to use tables. The following tables are divided in to six formation categories. Within these are listed most available drilling/coring bit by type and manufacturer. To use the listings, identify the formation to be drilled, decide which bit type is appropriate, i.e., rollers, fixed cutter, steel tooth, insert, diamond, etc., and choose the manufacturer.

Companies were asked to list bit date by: 1) IADC code, 2) readily available sizes (special sizes are often available on request), 3) recommended WOB in lb./in. diameter, and 4) codes for special features and usage, a combination of IADC and *World Oil* special codes, see Nomenclature.

IADC codes. The bit classifier utilizes the International Association of Drilling Contractors' (IADC) classification system for roller and fixed cutter bits. The standards for these classifications are two technical papers that appear in the IADC Drilling Manual, 11th Edition, Chapter A, Sections 2 and 3. The two papers are "The IADC roller bit classification system," adapted from IADC/SPE Paper 23937, presented Feb. 18-21, 1992", and "Development of a new IADC fixed cutter drill bit classification system, "Paper IADC/SPE 23940, presented Feb. 18-21, 1992". All manufacturers were asked to submit date based on these classification systems.

Formation categories. The tables show six formation categories corresponding to the new IADC formation types, as described below. Companies were asked to list any discrete bit in only formation type, leaving the user to decide about application in harder, or softer, rock. Nevertheless, some duplication of similar bits in multiple formations remains. The formations are:

- **Soft, including Soft and Sticky.** Low compressive strength and high drillability, such as clay, marl, gumbo, and unconsolidated sand.
- **Soft to Medium.** Low compressive strength, interbedded with hard layers such as sand, shale, anhydrite.
- **Medium.** Hard with moderate compressive strength such as shale, chalk, anhydrite, sand.
- **Medium to Hard**. Dense with increasing compressive strength but not- or semi- abrasive, e.g., siltstone, sand, lime, anhydrite.
- **Hard**. Hard and dense with high compressive strength, some abrasive layers, such as sand, siltstone.
- **Extremely Hard**. Very hard and abrasive, like quartsite and volcanics.

Nomenclature

World Oil shows special features as codes, which include 16 designed by IADC and defined in the above papers, plus 10 featured exclusively by World Oil for added descriptions. The codes are:

IADC

A – Air drilling application	L – Lug Pads
B – Special bearing seal	M – Motor application
C – Center jet	S – Standard steel tooth model
D – Deviation control	T – Two cone bit
E – Extended jet (full length)	W – Enhanced cutting structure
G – Gauge/body protection (additional)	X – Predominately chisel tooth insert
H – Horizontal steering application	Y – Conical tooth insert
J – Jet deflection	Z – Other shape insert

World Oil

F – Face discharge port	P – Percussion drilling
I – Thermally stable synthetic Diamond (TSP)	Q – Lateral nozzles
K – Cross flow hydraulics	
N – Turbine drilling	R – Radial flow hydraulics
	U – Cutter density: light (l), medium (m), heavy (h) e.g. Ul, Um, Uh
O – Milling applications	V – Anti-whirl characteristics

Companies Surveyed
Company names, as shown in the following listing, were shortened to conserve space.

Baker Hughes INTEQ	Baker Hughes INTEQ	Kingdream	Kingdream Public Ltd. Co.
BBL Brit Bit	BBL Brit Bit Ltd.	New Tech	New Tech Rock Bit Co.
Bit-Tech	Bit-Tech	RBI/Gearheart	RBI/Gearheart
Christensen Products	Christensen Products	Reed	Reed Tool CO.
Crystal	Crystal Profor SA	RockBit	Rockbit Industries of Canada
DPI	Diamond Products International	Security DBS	Security DBS,Division of Dresser Industries Inc.
GeoDiamond	GeoDiamond	Smith	Smith International Inc
Hughes	Hughes Christensen	TIX	TIX Crop., TSK Division
Hycalog	Hycalog	Tri-Max	Tri-Max Industries
Industrial	Industrialexport S.A.	Varel	Varel Manufacturing Co.

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Drill Bits Table

Extremely Hard
- Insert Roller Cone Bits
- PDC Coring Bits
- PDC Drill Bits
- Surface Set Diamond Bits
- Surface Set Diamond Coring Bits
- Steel Tooth Roller Cone Bits

Hard
- Insert Roller Cone Bits
- PDC Drill Bits
- Surface Set Diamond Coring Bits
- Surface Set Diamond Bits
- Steel Tooth Roller Cone Bits
- PDC Coring Bits

Medium
- PDC Drill Bits
- Insert Roller Cone Bits
- Surface Set Diamond Coring Bits
- Surface Set Diamond Bits
- Steel Tooth Roller Cone Bits
- PDC Coring Bits
- Fish Tail Bits

Medium-Hard
- Surface Set Diamond Coring Bits
- Surface Set Diamond Bits
- Steel Tooth Roller Cone Bits
- PDC Drill Bits
- PDC Coring Bits
- Insert Roller Cone Bits

Soft and Sticky
- Steel Tooth Roller Cone Bits
- PDC Drill Bits
- Insert Roller Cone Bits
- Surface Set Diamond Coring Bits
- PDC Coring Bits
- Fish Tail Bits

Soft-Medium
- PDC Drill Bits
- Insert Roller Cone Bits
- Steel Tooth Roller Cone Bits
- PDC Coring Bits
- Surface Set Diamond Bits
- Surface Set Diamond Coring Bits
- Fish Tail Bits

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Extremely Hard						
Insert Roller Cone Bits						
Hughes	HR-90	837	81/2	4,000-6,500	55-30	GW
	HR-99	837	83/4	4,000-6,500	55-30	GW
	STX-90	837	4 1/8	2,000-5,000	250-80	GW
	ATJ-99	837	77/8, 83/4, 97/8	4,000-6,500	55-30	
Industrial	TEA	727	33/4, 53/4, 61/2	4,500-6,000	45-60	
	TEAKA	712	81/2, 95/8	4,500-6,000	45-60	
	TEAKGJ	717	61/2, 71/2, 83/8,	4,500-6,000	45-60	
Kingdream	H837	837	6	3,500-6,500	60-35	GL
	HA837	837	6	3,500-6,500	60-35	GL
New Tech	NT9	837	77/8, 81/2, 83/4	3,000-6,000	35-65	GZ
RBI/Gearhart	C8	817Y	43/4, 57/8, 6, 63/4,	3,000-6,500	70-35	ACEGHLM
	C8LRGSP	817Y	43/4, 57/8, 6, 63/4,	3,000-6,500	70-35	ACEGHM
	C9	837Y	41/8, 57/8, 6, 61/8,	3,000-6,500	70-35	ACEGHLM
	C9	837Y	63/4, 77/8, 81/2,	3,000-6,500	70-35	ACEGHLM
	C9LRGSP	837Y	41/8, 57/8, 6, 61/8,	3,000-6,500	70-35	ACEGHM
	C9LRGSP	837Y	63/4, 77/8, 81/2,	3,000-6,500	70-35	ACEGHM
Reed	SL83	837	6	3,500-6,500	60-35	Y
	SL83DH	837	6	3,500-6,500	60-35	Y
	SL83H	837	6	3,500-6,500	60-35	Y
	EHP83	837	6	3,500-6,500	60-35	Y
	EHP83DH	837	6	3,500-6,500	60-35	Y
	EHP83FDA	837	57/8	3,500-6,500	60-35	Y
	HP83	837	81/2, 8 3/4, 97/8,	3,500-6,500	60-35	Y
	HP83DH	837W	81/2, 8 3/4, 97/8	3,500-6,500	70-40	WY
Security DBS	H89F	817	77/8, 97/8	4,000-7,500	55-40	B
	H100F	837	57/8, 81/2, 83/4, 9	4,500-7,500	50-30	BY
	H100F	837	97/8, 11, 121/4,	4,500-7,500	50-30	BY
	H100	835	171/2	4,000-7,000	55-40	Y
Smith	F8OD	817Y	77/8-121/4	4,000-7,000	50-110	YW
	F8DDPD	817Y	61/8	4,000-7,000	50-110	YW
	9JA	832Y	83/4-105/8	3,500-6,500	50-110	YA
	F8	817Y	77/8-97/8	4,000-7,000	50-110	Y
	F9	837Y	61/8-97/8	4,000-7,000	50-110	Y
	F9OD	837Y	77/8-121/4	4,000-7,000	50-110	YW
TIX	X90G	837Y	81/2, 121/4	3,000-6,500	40-60	GY
	A90	832Y	63/4, 75/8	2,500-5,000	30-50	AGY
	A90	832Y	9, 95/8, 97/8, 11,	3,000-6,000	30-50	AGY
	A90	832Y	15	2,500-5,000	30-50	AGY
Tri-Max	TM832	832	6-121/4	2,000-5,500	60-100	
	TM837	837	6-121/4	2,000-5,500	60-85	
Varel	ETD85	817Y	77/8	4,000-7,000	60-30	W
	ETD95	837Y	81/2	4,000-7,000	60-30	W
PDC Coring Bits						
DPI	CIF89	M841	61/4-83/8			G

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
GeoDiamond	M06	M442	4-3/4	400-3000	60-600	GMNUhVW
	M07	M442	2-3/4-3-7/8	400-3000	60-600	GMNUhVW
	M09	M442	3-1/4-12-1/4	400-3000	60-900	GMNUhVW
Surface Set Diamond Bits						
Bit-Tech	DN405RSP	M812	31/2-83/4	1000-4000	60-120	Custom
Crystal	H600	M814	53/4, 57/8, 6, 61/8,	500-2,000	80-1000	GMNUh
	H600	M814	63/4, 77/8, 83/8,	500-2,000	80-1000	GMNUh
GeoDiamond	D42	M712	37/8-81/2	800-4,000	100-900	MNGUhHK
	D54	M713	41/2-61/2	800-4,000	100-900	MNGUmHK
	D62	M613	57/8-81/2	800-4,000	100-900	MNGUhHK
	D71	M613	37/8-121/4	800-4,000	100-900	MNGUmHR
	D72	M713	37/8-121/4	800-4,000	100-900	MNGUhHK
	K33	M841	6-81/2	350-4,000	100-1200	MNGUhHK
	K35	M841	57/8-121/4	350-3500	100-1200	MNGUmHK
	XTG42	M842	77/8	400-2,000	80-900	GMNUmVW
	XTG44	M842	57/8-83/4	400-2,000	80-900	GMNUmVW
Hughes	D24	M712	43/4-121/4	1,000-4,000	75-500	MK
	S279P	M841	43/4-121/4	500-3,500	75-500	MNDIRWUh
	S279PX	M841	43/4-121/4	500-3,500	75-500	MNDIRWUh
	S279	M841	43/4-121/4	500-3,500	75-500	MNDIRWUh
	S280	M841	6-81/2, 105/8-	500-3,500	75-500	MNDIRWUh
Hycalog	372	M842	81/2	1,000-4,000	Variable	GHMNRWI
	375	M842	81/2	1,000-4,000	Variable	GHMNRWI
	450	M842	6-81/2	1,000-4,000	Variable	GHMNR
	451	M842	8.5	1,000-4,000	Variable	GHMNR
	452	M843	33/4-171/2	1,000-4,000	Variable	GHMNR
	453	M843	33/4-171/2	1,000-4,000	Variable	GHMNR
	454	M843	33/4-171/2	1,000-4,000	Variable	GHMNR
	455	M843	33/4-171/2	1,000-4,000	Variable	GHMNR
	462	M842	33/4-171/2	1,000-4,000	Variable	GHMNR
	463	M842	33/4-171/2	1,000-4,000	Variable	GHMNR
	464	M842	33/4-171/2	1,000-4,000	Variable	GHMNR
	465	M842	41/8-171/2	1,000-4,000	Variable	GHMNR
	466	M842	41/8-171/2	1,000-4,000	Variable	GHMNR
	470	M842	41/8-171/2	1,000-4,000	Variable	GHMNR
	471	M842	41/8-171/2	1,000-4,000	Variable	GHMNR
	472	M842	41/8-171/2	1,000-4,000	Variable	GHMNR
	473	M842	33/4-171/2	1,000-4,000	Variable	GHMNR
	474	M842	33/4-171/2	1,000-4,000	Variable	GHMNR
	475	M842	33/4-171/2	1,000-4,000	Variable	GHMNR
	542	M812	8 1/2 x 9 1/4	2,000-4,000	Variable	GHMKN
	585	M812	37/8-81/2	2,000-4,000	Variable	GHMKN
	733	M713	33/4-121/4	2,000-4,000	Variable	GHMKN
	261ND	M722	41/4-121/4	600-3,500	Variable	GHMWIKN
	263ND	M722	57/8-121/4	600-3,500	Variable	GHMWIKN
Security DBS	TI2352	M843	41/8, 51/2, 57/8, 6,	300-3,000	80-1000	IMN
	TI2352	M843	61/2, 83/8, 81/2,	300-3,000	80-1000	IMN
	Fi2241	M841	57/8-81/2	300-3,000	80-1200	VMT
	Fi2641	M841	57/8-121/4	300-3,500	80-1200	VMT
	Fi2841	M841	57/8-81/2	300-3,000	80-1200	VMT
Varel	H600	M814	53/4, 57/8, 6, 61/8,	500-2,000	80-1000	GMNUh
	H600	M814	63/4, 77/8, 83/8,	500-2,000	80-1000	GMNUh

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Surface Set Diamond Coring Bits						
Baker Hughes -INTEQ	C23	D5X9	43/4 x 121/4	500-3,500	60-500	Round M
	SC279	D5R0	43/4-121/4	750-3,500	60-500	Round NM
	SC278	T2X9	43/4-121/4	750-3,500	60-500	Round KM
Bit-Tech	CN-425BLP	M842	61/8, 63/4	1000-3000	60-90	AGRUhW
	CN-405RSP	M812	61/8, 77/8, 81/2,	1000-3000	60-90	AGKUhW
Crystal	C600	M814	57/8, 531/32, 6,	100-2,000	60-120	GKUh
	C600	M814	61/2, 77/8, 83/8,	100-2,000	60-120	GKUh
Security DBS	CI352	M843	6-121/4	250-3,500	50-70	G
Varel	C600	M814	57/8, 531/32, 6,	100-2,000	60-120	GKUh
	C600	M814	61/2, 77/8, 83/8,	100-2,000	60-120	GKUh
Steel Tooth Roller Cone Bits						
Tri-Max	TM321	321	6-171/2	2,000-5,000	60-85	DG

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Hard						
Insert Roller Cone Bits						
Hughes	HR-80	747	105/8, 131/8	3,000-6,000	65-35	GW
	HR-88	747	7 7/8	3,000-6,000	65-35	GW
	STR-70	737	41/8, 41/2, 43/4,	2,000-5,000	250-80	GW
	STR-70DX	737	61/8	2,000-5,000	250-80	GW
	STR-70FDX	737	61/8	2,000-5,000	250-80	GW
	STR-77	737	41/2-61/2	2,000-5,000	250-80	GW
	ATJ-77	737	77/8, 83/4, 97/8,	3,000-6,000	65-35	
	ATJ-88	747	77/8, 83/4, 97/8	4,000-6,500	55-30	
Industrial	TEAKGJ	737	61/4-81/2	4,500-6,000	45-60	
Kingdream	HJT737	737	81/2,121/4	3,500-6,500	180-40	CEGL
New Tech	NT7	737Z	77/8, 81/2, 83/4	3,000-6,000	35-70	CGLM
RBI/Gearhart	C7	737Y	37/8, 41/8 43/4,	3,000-6,500	70-35	ACEGHLM
	C7	737Y	61/2,- 63/4, 77/8,	3,000-6,500	70-35	ACEGHLM
	C7LRGSP	737Y	37/8, 41/8, 43/4,	3,000-6,500	70-35	ACEGHM
	C7LRGSP	737Y	61/2, 63/4, 77/8,	3,000-6,500	70-35	ACEGHM
	C75	737Y	77/8, 121/4	3,000-6,500	70-35	ACEGHLM
	C75LRGRSP	737Y	77/8, 121/4	3,000-6,500	70-35	ACEGHM
	C65LRGSP	647Y	121/4	3,000-6,500	70-35	ACEGHM
	B7LRGSP	737Y	41/8, 43/4, 57/8, 6,	3,000-6,500	180-35	AGHLM
Reed	EHP73	737	6 1/8, 61/2	3,500-6,500	70-40	Y
	HP73	737	5 1/2, 83/8, 81/2	3,500-6,500	70-40	Y
	HP73DH	737W	81/2	3,500-6,500	70-40	WY
	HP74	747	77/8, 81/2, 83/4, 9	3,500-6,500	70-40	Y
	HP74DH	747	77/8, 81/2, 83/4, 9	3,500-6,500	70-40	GY
Security DBS	XT(D)71,73,75	715	131/2, 143/4, 16,	1,000-7,000	35-65	BW
	XS(D)71,73,75	717	43/4, 57/8, 6, 61/8,	1,000-7,000	35-65	BW
	XS(D)71,73,75	717	77/8, 81/2, 83/4,	1,000-7,000	35-65	BW
	XT(D)77,79,81	735	131/2, 143/4, 16,	1,000-7,000	35-65	BW
	XS(D)77,79,81	737	43/4, 57/8, 6, 61/8,	1,000-7,000	35-65	BW
	XS(D)77,79,81	737	77/8, 81/2, 83/4,	1,000-7,000	35-65	BW
	XT(D)83,85, 87,89	745	131/2, 143/4, 16, 26, 28	1,000-7,000	35-65	BW
	XS(D)83,85, 87,89	747	43/4, 57/8, 6, 61/8, 83/4, 97/8, 105/8,	1,000-7,000	35-65	BW
	XT(D)91,93	815	131/2, 143/4, 16,	1,000-7,500	30-60	BW
	XS(D)91,93	817	43/4, 57/8, 6, 61/8,	1,000-7,500	30-60	BW
	XS(D)91,93	817	77/8, 81/2, 83/4,	1,000-7,500	30-60	BW
	XT(D)95,97	825	131/2, 143/4, 16,	1,000-7,500	30-60	BW
	XS(D)95,97	827	43/4, 57/8, 6, 61/8,	1,000-7,500	30-60	BW
	XS(D)95,97	827	77/8, 81/2, 83/4,	1,000-7,500	30-60	BW
	XT(D)99	835	131/2, 143/4, 16,	1,000-7,500	30-60	BW
	XS(D)99	837	43/4, 57/8, 6, 61/8,	1,000-7,500	30-60	BW
	XS(D)99	837	77/8, 81/2, 83/4,	1,000-7,500	30-60	BW
Smith	7GA	732Y	81/2-83/4	3,500-6,500	40-70	YA
	F7	737Y	61/8-121/4	4,000-7,000	50-110	Y
	F7OD	737Y	61/8-121/4	4,000-7,000	50-110	YW
	F7DDPD	737Y	81/2	4,000-7,000	50-110	YW
	XR70Y	737Y	6-6 3/4	2,000-6,000	40-270	YHM
	XR70YD	737Y	6-6 3/4	2,000-6,000	40-270	YHM
TIX	X70G	737Y	55/8, 57/8, 75/8	3,000-5,000	40-60	GY
	X70G	737Y	81/2, 121/4	3,000-6,500	40-60	GY
Tri-Max	TM632	632	6-121/4	2,000-5,000	60-100	
	TM635	635	6-121/4	2,000-5,000	60-100	
	TM637	637	6-121/4	2,000-5,000	60-100	
	TM732	732	41/2-121/4	2,000-5,000	60-100	
	TM737	737	41/2-121/4	2,000-5,000	60-100	
Varel	V727	727Y	77/8, 81/2	3,500-6,500	70-40	
	V735	735Y	9-171/2	3,500-6,500	70-40	
	V737	737Y	77/8, 121/4	4,000-6,500	60-40	
	ETD75	737Y	81/2	4,000-6,500	70-40	W

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
GeoDiamond	DST12	M711	61/2-81/2	800-4,000	100-500	MNKMN
	M06	M442	43/4	400-3,000	60-600	GMNUmVW
	M07	M442	23/4-33/4	400-4,000	60-600	GMNUmVW
	M09	M442	31/4-121/4	400-3,000	60-900	GMNUhVW
	M16	M442	57/8-121/4	400-2,000	60-900	GMNUhVW
	M20	M442	41/8-63/4	400-2,000	60-900	GMNUmVW
	M22	M432	81/2	400-2,000	60-900	GMNUmVW
	M27	M432	33/4	400-4,000	60-600	GMNUlVW
	M29	M422	17	400-4,000	60-600	GMNUlVW
	M30	M433	171/2	400-3,000	60-900	GMNUhVWA
	M33	M432	55/8-171/2	400-2,000	60-900	GMNUhVW
	M34	M433	81/2-121/4	400-2,000	60-900	GMNUhVW
	M35	M433	143/4	400-3,000	60-900	GMNUhVW
	M36	M433	83/8-121/4	400-2,000	80-900	GMNUhVW
	M37	M433	75/8-121/4	400-2,000	80-900	GMNUhVW
	M39	M333	77/8-83/4	400-2,000	80-900	GMNUhVW
	M40	M333	61/2-97/8	400-2,000	80-900	GMNUmVW
	MA29	M223	81/2-17	400-2,000	80-900	GMNUmVW
	MA31	M432	77/8-83/4	400-2,000	80-900	GMNUmVW
Hughes	BD536H	M423	77/8 - 171/2	300-3,000	60-300	MW
	BD548	M423	77/8 - 171/2	300-3,000	60-300	MW
	BD447H	M432	77/8 - 171/2	300-3,000	60-350	MW
	BD449H	M433	77/8 - 171/2	300-3,000	60-300	MW
	G547	M423	121/4-171/2	300-3,000	60-240	MW
	AG548	M423	121/4-171/2	500-3,500	60-240	MDVW
	G549	M423	121/4-171/2	300-3,000	60-240	W
	G559	M423	121/4-171/2	300-3,000	60-240	W
	G412	M433	77/8-121/4	500-3,500	60-240	MNDW
	AG437	M433	77/8-121/4	500-3,500	60-240	MDVW
	G437	M433	77/8-121/4	500-3,500	60-240	MNDW
	G447	M433	15-Jun	500-3500	60-240	MNDW
Hycalog	DS66H	M432	61/2-171/2	450-3,200	Variable	GHMWNUhV
	DS66D	M432	61/2-121/4	450-3,200	Variable	GHMWNUhV
	DS72	S323	57/8-81/2	450-3,200	Variable	GHMWNUhV
	DS73	M432	171/2	450-3,200	Variable	GHMWUhV
	DS89	M434	12-121/4	450-3,200	Variable	GHMWNUhV
	DS125D	M433	121/4	450-3,200	Variable	GHMWUhV
	DS165D	M432	83/8-81/2	450-3,200	Variable	GHMWNUhV
	DS169	M433	143/4	450-3,200	Variable	GHMWNUhV
	DS171H	M443	81/2	450-3,200	Variable	GHMWNUhV
	DS175D	M433	121/4	450-3,200	Variable	GHMWNUhV
Kingdream	D756	M713	6,81/2	2,000-5,000	60-350	
	D854	M813	6,81/2	2,000-5,000	60-350	
RockBit	KD5808	S443	6,61/8,61/4,77/8,8	500-3000	60-400	GHMVW
	KD5908	S443	6,61/8,61/4,77/8,8	500-3000	60-400	GHMVW
Security DBS	FM2821	M442	57/8, 6, 61/8, 61/2	500-2,500	60-450	MVW
	FM2821	M442	77/8	500-2,500	60-450	MVW
	FM2921	M443	56/8, 57/8, 6, 61/8,	300-3,000	60-400	MVW
	FM2941	M432	81/2	500-2,500	60-450	MVW
	FM2831	M442	6, 61/8, 61/2, 63/4,	500-2,000	60-400	MVW
	FM2933	M443	81/2	500-2,000	60-400	MVW
	FM2931	M442	97/8	500-2,000	60-400	MVW
	FM2841i	M342	83/8-81/2	500-3,000	100-400	MVW
	FM2843i	M343	83/8-81/2	500-3,000	100-400	MVW
	FM2845i	M344	83/8-81/2	500-3,000	100-400	MVW
	FM2941i	M442	83/8-81/2	500-3,000	100-400	MVW
	FM2943i	M443	83/8-81/2	500-3,000	100-400	MVW
	FM2945i	M444	121/4-171/2	500-3,500	100-400	MVW
	SE3841i	M342	83/8-81/2	500-3,000	100-400	DMVW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Surface Set Diamond Coring Bits						
Baker Hughes - INTEQ	C23	D5X9	43/4x121/4	500-3,500	60-500	Round
	SC278	T2X9	43/4-121/4	750-3,500	60-500	Round K
	SC777	TSR8	41/8-97/8	500-2500	60-500	Round R
Bit-Tech	CN-424BLP	M842	61/8, 63/4	750-2500	60-120	AGMR
	CN-404RSP	M812	61/8, 77/8, 81/2,	750-2500	60-120	AGKM
	CN-404P	M812	6, 61/8, 77/8, 83/4	750-2500	60-120	AGKM
Crystal	C400	M712	57/8, 531/32, 6,	100-2,000	60-120	GKUh
	C400	M712	77/8, 83/8, 81/2	100-2,000	60-120	GKUh
	C500	M812	57/8, 531/32, 6,	100-3,000	60-120	GKUh
	C500	M812	61/2, 77/8, 83/8,	100-3,000	60-120	GKUh
Security DBS	CI352	M843	6-121/4	250-3,500	50-70	G
Varel	C400	M712	57/8, 531/32, 6,	100-2,000	60-120	GKUh
	C400	M712	61/2, 77/8, 83/8,	100-2,000	60-120	GKUh
	C500	M812	57/8, 531/32, 6,	100-3,000	60-120	GKUh
	C500	M812	61/2, 77/8, 83/8,	100-3,000	60-120	GKUh
Surface Sets Diamond Bits						
Bit-Tech	DN-424P	M812	13/4, 1/7/8, 21/8,	1000-3000	60-1000	ADGHMNR
	DN-424P	M812	41/2, 43/4, 61/8,	1000-3000	60-1000	ADGHMNR
	DN-304P	M813	41/2-43/4, 51/2-	1000-3000	60-1000	Custom
Crystal	H300	M713	41/8, 53/4, 57/8, 6,	500-2500	80-1000	GMNUh
	H300	M713	61/2, 63/4, 77/8,	500-2500	80-1000	GMNUh
	H400	M712	41/8, 53/4, 57/8, 6,	500-3500	80-1000	GMNUh
	H400	M712	61/2, 63/4, 77/8,	500-3500	80-1000	GMNUh
	K300	M711	53/4, 57/8, 6, 61/8,	500-3,000	80-500	GMUh
	K300	M711	77/8, 83/8, 81/2,	500-3,000	80-500	GMUh
	DK300	M711	53/4, 57/8, 6, 61/8,	500-3,000	80-500	DGMUh
	DK300	M711	77/8, 83/8, 81/2,	500-3,000	80-500	DGMUh
DPI	NR87	MX12	33/4-121/4	300-3,000	60-1,000	HKMT
	N26ST	M711	41/2-121/4	300-3,000	60-1,000	HKMOT
	NM55	M713	41/8, 41/2,	300-3,000	60-1,000	HKMT
	NM33	M713	6-121/4	300-3000	100-700	GHMN
GeoDiamond	D54	M714	43/4	800-4,000	100-500	MNGUmHK
	D62	M613	6-81/2	800-4,000	100-500	MNGUhHK
	D71	M613	6	800-4,000	100-500	MNGUmHR
	D72	M613	37/8-121/4	800-4,000	100-500	MNGUhHK
	D73	M713	37/8-121/4	800-4,000	100-500	MNGUmHR
	XTG42	M842	77/8	400-2,000	80-900	GMNUmVW
	XTG44	M842	57/8-83/4	400-2,000	80-900	GMNUmVW
	XTG46	M842	61/2	400-2,000	80-900	GMNUmVW
	XTG48	M842	57/8-16	400-2,000	80-900	GMNUmVW
	XTN33	M841	81/2	400-2,000	80-900	GMNUmVW
Hughes	S279P	M841	57/8-121/4	450-3,000	75-1,000	MNIRWUh
	S280P	M841	6-121/4	450-3,000	75-1,000	MNIRWUh
	S725	M624	43/4-121/4	300-3,000	100-500	MIR
	D41	M712	43/4-121/4	1,000-4,000	75-500	MK
	D24	M712	43/4-121/4	1,000-4,000	75-500	MK
Hycalog	440	M843	33/4-121/4	1,000-4,000	Variable	GHMNR
	441	M843	121/4	1,000-4,000	Variable	GHMNR
	442	M843	33/4-121/4	1,000-4,000	Variable	GHMNR
	443	M843	33/4-121/4	1,000-4,000	Variable	GHMNR
	444	M843	33/4-121/4	1,000-4,000	Variable	GHMNR
	445	M843	33/4-121/4	1,000-4,000	Variable	GHMNR
	446	M843	33/4-16	1,000-4,000	Variable	GHMNR
	447	M843	33/4-16	1,000-4,000	Variable	GHMNR
	640	M843	33/4-121/4	1,000-4,000	Variable	GHMNR
	642	M843	33/4-121/4	1,000-4,000	Variable	GHMNR
	645	M843	33/4-121/4	1,000-4,000	Variable	GHMNR
	730	M713	111/16-81/2	2,000-4,000	Variable	GHMKN
	744	M713	4-61/2	2,000-4,000	Variable	GHMKN
	241ND	M623	53/8-81/2	600-3,000	Variable	GHMWIKN
	243ND	M723	43/4-121/4	600-3,000	Variable	GHMWIKN

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Surface Sets Diamond Bits						
Security DBS	TI2352	M843	41/8, 51/2, 57/8, 6,	300-3,000	80-1000	IMN
	TI2352	M843	61/2, 83/8, 81/2,	300-3,000	80-1000	IMN
	Fi2241	M841	57/8-81/2	300-3,000	80-1200	VMT
	Fi2641	M841	57/8-121/4	300-3,500	80-1200	VMT
	Fi2841	M841	57/8-81/2	300-3,000	80-1200	VMT
	TiP2352	M841	57/8-81/2	300-3,000	80-1200	IMN
	TiB3846	M841	57/8	300-3,000	80-1200	IMN
	TiB3046	M841	83/8-81/2	300-3,000	80-1200	IMN
Varel	H300	M713	41/8, 53/4, 57/8, 6,	500-2500	80-1000	GMNUh
	H300	M713	61/2, 63/4, 77/8,	500-2500	80-1000	GMNUh
	H400	M712	41/8, 53/4, 57/8, 6,	500-3500	80-1000	GMNUh
	H400	M712	61/2, 63/4, 77/8,	500-3500	80-1000	GMNUh
	K300	M711	53/4, 57/8, 6, 61/8,	500-3,000	80-500	GMUh
	K300	M711	77/8, 83/8,81/2,	500-3,000	80-500	GMUh
	DK300	M711	53/4, 57/8, 6, 61/8,	500-3,000	80-500	DGMUh
	DK300	M711	77/8, 83/8, 81/2,	500-3,000	80-500	DGMUh
Steel Tooth Roller Cone Bits						
Hughes	R7	321	61/8, 81/2, 121/4	3,000-6,000	150-50	
	ATJ-G8	347	81/2, 121/4	3,000-6,000	150-50	G
Industrial	TA	311	41/8-20	6,000-8,000	50-70	
	TA-A	322	41/2-121/4	6,000-8,000	50-70	
	TA-J	321	55/8-20	6,000-8,000	50-70	
	TAD	313	61/4-81/2	6,000-8,000	50-70	
Kingdream	W321	321	121/4	1,500-4,500	200-80	CEGL
Security DBS	XN5	311	43/4, 57/8, 6, 61/8,	1,000-6,000	80-110	
	XN5	311	63/4, 77/8, 81/2,	1,000-6,000	80-110	
TIX	H	321	3, 37/8, 4, 41/2	1,500-2,500	40-60	
	H	321	43/4	1,500-3,000	40-60	
	H	321	55/8, 57/8, 6, 61/4,	2,500-5,000	40-80	
	H	321	81/2, 85/8, 91/2,	3,000-5,000	40-80	
	H	321	133/8, 143/4, 15,	3,000-5,000	40-80	
	H-X	326	57/8, 6	3,000-5,000	40-70	B
	H-X	326	81/2, 121/4	3,000-6,000	40-70	B
	HS	311	6, 61/8, 71/2, 75/8,	2,500-5,000	40-80	
	HS	311	81/2, 91/2, 95/8,	3,000-6,000	40-80	
	HS	311	143/4, 15, 151/2,	3,000-5,000	40-80	
	HS-X	316	57/8, 6	3,000-5,000	40-70	B
	HS-X	316	81/2, 121/4	3,000-6,000	40-70	B
	HS-TX	317	57/8, 6	3,000-5,000	40-70	BG
	HS-TX	317	81/2, 121/4	3,000-6,000	40-70	BG
	HS-TZ	315	81/2, 121/4	3,000-6,000	40-70	G
	HS-TZ	315	171/2	3,000-5,000	40-70	G
	HS-Z	314	81/2, 121/4	3,000-6,000	40-70	
	MS-TXZ	315	121/4, 171/2	3,000-6,000	40-100	
	HS-XZ	314	121/4, 171/2	3,000-6,000	40-100	
	H-Z	324	81/2, 121/4	3,000-6,000	40-70	
	H-XZ	324	121/4, 171/2	3,000-6,000	40-100	
	HR	341	81/2, 121/4	3,000-6,000	40-70	
	HR-X	346	81/2, 121/4	3,000-6,000	40-70	B
	HR-Z	344	81/2, 121/4	3,000-6,000	40-70	
Tri-Max	TM311	311	6-81/2	2,000-5,000	60-100	
	TM315	315	6-97/8	2,000-5,000	60-100	
	TM316	316	6-97/8	2,000-5,000	60-100	
	TM317	317	6-97/8	2,000-5,000	60-100	
Varel	L1	311S	27/8-171/2	3,500-7,000	80-40	S
	L314	314S	121/4	3,500-7,000	80-40	S
	L315	315S	81/2, 121/4, 171/2	3,500-7,000	80-40	S
	L316	316S	6, 81/2	4,000-7,500	80-40	S
	L317	317S	57/8, 6, 81/2,	4,000-7,500	80-40	S
	L321	321S	61/4-171/2	4,000-8,000	80-40	S
	LH1	321S	215/16-171/2	4,000-8,000	80-40	S
	L337	337S	115/8	4,000-8,000	80-40	S

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Coring Bits						
Baker Hughes-INTEQ	ARC427	M355	43/4-121/4	500-3,000	50-500	Low Inv VGMF
	RC478	M565	43/4-121/4	500-3,000	60-500	Round
Bit-Tech	CP-440BUP	M242	6, 61/8	300-2000	50-300	AFGMVW
	CP-440BUP	M232	77/8, 81/2, 83/4	300-2000	50-300	AFGMVW
DPI	CNR67	M812	61/8-83/4			G
	CNM66	M813	61/2-823/32			G
	CNM44	M813	815/32			G
	CNR78	M812	81/2			G
	CTR77	M722	81/2			G
Kingdream	PC832	M823	57/8,6,81/2	2,000-4,000	60-500	
Security DBS	FCi274LI	M343	81/2-121/4	250-3,500	50-150	F
	FCi284LI	M343	81/2-121/4	250-3,500	50-150	F

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Medium						
PDC Drill Bits						
BBL Brit Bit	BB450X	O323	55/8-63/4	2,000	Any	GKMNQUmV
	BB480X	X	43/4	2,000	Any	KMQUmV
	BB490X	O243	33/4	2,000	Any	GKMQUmV
	BB481X	O333	43/4	2,000	Any	GKMQUmV
	BB650X	O323	83/8-121/4	3,000	Any	GKMNQUmV
	BB652X	O323	83/8-121/4	3,000	Any	GKMNQUmV
	BB677X	O333	83/8-121/4	3,000	Any	GKMNQUmV
	BB881X	O433	55/8-61/8	2500	Any	GKMNQUmV
Bit-Tech	HP-440-B	M342	31/2, 35/8, 33/4, 41/2, 45/8, 43/4,	200-3000	200-1000	ADFGHMNV
	HP-440-B13	M232	6, 61/8, 61/4, 61/2,	200-3000	60-600	ADGHMVW
	DP-440-B2U	M242	77/8, 81/2, 83/4	400-3000	60-600	ADGMVW
Crystal	RD90 H	M433	41/8, 53/4, 57/8, 6, 81/2, 83/4, 97/8,	400-2,000	80-500	GIMUm
	RD90 HY	M433	41/8, 53/4, 57/8, 6, 81/2, 83/4, 97/8,	400-2,000	80-500	GIMUm
	LS427	M333	41/8, 53/4, 57/8, 6, 81/2, 83/4, 97/8,	400-2,000	80-500	GIMUm
	LD548H	M424	83/8, 81/2, 83/4,	400-2,000	80-500	GIMUm
	S280 H	M434	83/8, 81/2, 83/4,	400-2,000	80-1000	GIMNUhV
	S280 HY	M434	83/8, 81/2, 83/4,	400-2,000	80-1000	GIMNUhV
	LS328	M432	83/8, 81/2, 83/4,	400-2,000	80-1000	GIMNUhV
	LS429	M343	83/8, 81/2, 83/4,	400-2,000	80-1000	GIMNUhV
	RD1002	M432	53/4, 57/8, 6, 61/8, 81/2, 83/4, 97/8,	400-2,000	80-500	GHIMUhV
	RD1001	M432	53/4, 57/8, 6, 61/8, 81/2, 83/4, 97/8,	400-2,000	80-500	GHIMUhV
	LS328DR	M432	83/8, 81/2, 83/4,	400-2,000	80-1000	GIMNUhV
	XS366	M432	83/8, 81/2, 83/4,	400-2,000	80-1000	GIMNUhV
DPI	MP66	M323	81/2, 83/4, 121/4			
	SD546	S223	121/4			
	SD566	S223	81/2, 121/4			
	SD646	S323	121/4			
	SD677	S323	81/2			
	SD746	S323	81/2, 83/4			
	CSD433		43/4 x 55/8			
	CSD444		6 x 7, 61/2 x 71/2,			
	SR(F)644		41/2 x 51/4			
	SR(F)744		6 x 61/2			
	SR(F)933		23/4 x 3, 27/8 x			
	SC67	S423	61/8-121/4	200-3,500	60-450	DHKMN
	MT35	M242	43/4, 53/4, 57/8,	250-3,500	60-450	DHKMV
	SC45	S333	61/8, 61/4, 77/8,	200-3,500	60-450	DHKMV
	MT46	M333	61/8, 81/2, 83/4,	200-3,500	60-450	DHKMV
	MC65	M233	81/2, 121/4	200-3,500	60-450	DHKMV
	MC45	M233	6, 61/8, 63/4, 77/8,	200-3,500	60-450	DHKMV
	SC65	S223	81/2, 97/8, 121/4,	200-3,500	60-450	DHKMV
	ST46	S332	77/8	200-3,500	60-450	DHKMV
	SC47	S332	81/2	200-3,500	60-450	DHKMV
	SS67	S323	97/8	200-3,500	60-450	DHKMV
	MC46	M332	81/2 , 83/4	200-3,500	60-450	DHKMV
	MC47	M332	57/8-63/4	200-3,500	60-450	DHKMV
	MC67	M323	77/8-121/4	200-3,500	60-450	DHKMV
	SR(F)344 Bi-Center		61/2 x 8, 63/4 x 81/2 x 97/8, 105/8	250-3,500	60-200	DGHKMV
	SR(F)366 Bi-Center		105/8 x 121/4	250-3,500	60-200	DGHKMV

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
DPI	SR(F)444 Bi-Center		61/2 x 71/2, 83/8 x	250-3,500	60-200	DGHKMV
	SR(F)533 Bi-Center		33/4 x 41/4, 33/4 x	250-3,500	60-200	DGHKMV
	SR(F)544 Bi-Center		43/4 x 55/8, 6 X 7	250-3,500	60-200	DGHKMV
	M45ST	M232	81/2, 91/2	200-3,500	60-450	DHKMV
	MC44	M233	121/4	200-3,500	60-450	DHKMV
	MC64	M223	97/8-121/4	200-3,500	60-450	DHKMV
	MT44	M232	77/8-121/4	200-3,500	60-450	DHKMV
	MT45	M232	61/4-121/4	200-3,500	60-450	DHKMV
	MT64	M222	121/4	200-3,500	60-450	DHKMV
	MT65	M223	121/4	200-3,500	60-450	DHKMV
	SD65	S323	121/4			DGHKMV
	CSD544 Bi-Center		6 X 7			DGHKMV
	SR(F)344 Bi-Center		61/2 x 8 , 63/4 x 105/8 x 111/2,			
	SR(F)444 Bi-Center		61/4 X 71/2, 83/8 x			DGHKMV
GeoDiamond	BC22 Bi-Center	S243	6x7-81/2x97/8	400-2,000	60-600	GMNUmVW
	BC25 Bi-Center	S343	41/8x43/4	400-2,000	60-600	GMNUmVW
	BC27 Bi-Center	S243	23/4X3-	400-2,000	60-600	GMNUmVW
	BC40 Bi-Center	S333	121/4x143/4	400-2,000	60-600	GMNUmVW
	BC56 Bi-Center	S233	121/4x143/4-	400-2,000	60-600	GMNUmVW
	BC59 Bi-Center	S233	51/2x61/2-	400-2,000	60-600	GMNUmVW
	BC75 Bi-Center	S223	81/2x97/8-	400-2,000	60-600	GMNUmVW
	BM09 Bi-Center	M442	43/4X5-51/8X43/4	400-2,000	60-600	GMNUmVW
	BM33 Bi-Center	M232	121/4X105/8	400-2,000	60-600	GMNUmVW
	BM57 Bi-Center	M132	7x6	400-2,000	60-600	GMNUmVW
	BM73 Bi-Center	M223	121/4x143/4	400-2,000	60-600	GMNUmVW
	M22	M432	81/2	400-2,000	60-600	GMNUmVW
	M23	M442	6-61/2	400-2,000	60-600	GMNUmVW
	M40	M333	57/8-121/4	400-2,000	60-600	GMNUmVW
	M41	M333	97/8	400-2,000	60-600	GMNUmVW
	M42	M333	77/8-121/4	400-2,000	60-600	GMNUmVW
	M44	M423	61/8-63/4	400-2,000	60-600	GMNUmVW
	M50	M333	6-121/4	400-2,000	60-600	GMNUmVW
	M53	M232	57/8-81/2	500-3,000	60-600	GMNUmVW
	M58	M131	67/8-81/2	500-2,000	60-400	GMNUmVW
	M61	M423	16	400-2,000	60-600	GMNUmVW
	M64	M223	121/4	400-2,000	60-600	GMNUmVW
	M68	M423	121/4-171/2	500-2,000	60-400	GMNUmVW
	M69	M223	77/8-121/4	400-2,000	60-600	GMNUmVW
	M70	M323	83/4	400-2,000	60-600	GMNUmVW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
GeoDiamond	M71	M323	105/8-121/4	400-2,000	60-600	GMNUmVW
	M73	M223	77/8-121/4	500-2,000	60-400	GMNUmVW
	M75	M233	12-143/4	400-2,000	60-600	GMNUmVW
	M77	M121	97/8-131/2	400-2,000	60-600	GMNUmVW
	M79	M121	57/8-61/4	500-3,000	60-600	GMNUmVW
	M80	M123	61/2-63/4	400-2,000	60-600	GMNUmVW
	M81	M121	81/2-97/8	400-2,000	60-600	GMNUmVW
	M83	M421	121/4-171/2	500-2,000	60-400	GMNUmVW
	M88	M223	77/8-121/4	400-2,000	60-600	GMNUmVW
	M90	M223	81/2-121/4	400-2,000	60-600	GMNUmVW
	MA74	M223	57/8-121/4	400-2,000	60-600	GMNUmVW
	MA82	M223	83/8-171/2	400-2,000	60-600	GMNUmVW
	S21	S442	81/2-83/4	400-2,000	60-600	GMNUmVW
	S38	S222	121/2	400-2,000	60-600	GMNUmVW
	S50	S222	81/2-121/4	400-2,000	60-600	GMNUmVW
Hughes	ATX437	M423	57/8 - 171/2	300-3,000	60-350	GVW
	ATX447	M433	57/8 - 171/2	300-3,000	60-350	GVW
	ATX548	M423	57/8 - 171/2	300-3,000	60-350	GVW
	TX480	M432	57/8 - 171/2	300-3,000	60-350	GW
	TX447	M433	57/8 - 171/2	300-3,000	60-350	GW
	ABD548	M423	77/8 - 171/2	300-3,000	60-350	GW
	ABD535	M422	77/8 - 171/2	300-3,000	60-350	GW
	ABD410	M433	77/8 - 171/2	300-3,000	60-350	GW
	ABD447	M433	77/8 - 171/2	300-3,000	60-350	GW
	BD536H	M423	77/8 - 171/2	300-3,000	60-350	GW
	BD449	M433	57/8 - 171/2	300-3,000	60-350	GW
	BX449	M433	57/8 - 171/2	300-3,000	60-350	MW
	BX548	M423	57/8 - 171/2	300-3,000	60-350	MW
	AG545	M323	81/2-171/2	300-3,000	60-240	MVW
	G545	M323	81/2-171/2	300-3,000	60-240	MW
	G547	M423	121/4 - 171/2	300-3,000	60-240	MW
	G438	M333	57/8-81/2	400-3,500	80-500	MDHW
	STR335	M333	23/4 - 63/4	600-2500	60-500	MHW
	STR447	M333	31/8 - 63/4	600-2500	60-500	MHW
	STR408	M333	31/8 - 63/4	600-2500	60-500	MHW
	STR409	M333	31/8 - 63/4	600-2500	60-500	MHW
	STX335	M333	23/4 - 63/4	600-2500	60-500	MHW
	STX404	M4323	31/8 - 63/4	600-2500	60-500	MHW
	STX605	M323	6 - 63/4	600-2500	60-500	MHW
Hycalog	DS43ST	S132	57/8-121/4	400-3,000	Variable	GHMWUhV
	DS44ST	M132	81/2-121/4	400-3,000	Variable	GHMWUhV
	DS48	S433	121/4	400-3,000	Variable	GHMWUhV
	DS49ST	S233	83/4-121/4	400-3,000	Variable	GHMWUmV
	DS56D	M432	61/8-121/4	400-3,000	Variable	GHMWUmV
	DS59D	M332	61/4-121/4	400-3,000	Variable	GHMWUmV
	DS70	S323	77/8-97/8	400-3,000	Variable	GHMWUhV
	DS70H	S323	121/4-171/2	400-3,000	Variable	GHMWUhV
	DS75	M433	77/8-83/4	400-3,000	Variable	GHMWUhV
	DS77H	M423	101/2-171/2	400-3,000	Variable	GHMWUhV
	DS81	S322	121/4	400-3,000	Variable	GHMUhV
	DS88	M421	95/8-121/4	400-3,000	Variable	GHMUhV
	DS92H	S334	77/8-17	400-3,000	Variable	GHMWUhV
	DS93	M433	121/4	400-3,000	Variable	GHMWUhV
	DS94H	M434	81/2-171/2	400-3,000	Variable	GHMWUhV
	DS96	S242	55/8-6	400-3,000	Variable	GHMUhV
	DS102H	S433	61/2 x 71/2-141/2	400-3,000	Variable	GHMUhV
	DS102HD	S433	81/2 x 97/8-105/8	400-3,000	Variable	GHMUhV

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
Hycalog	DS103H	M421	105/8-143/4	400-3,000	Variable	GHMWUmV
	DS103D	M421	121/4-143/4	400-3,000	Variable	GHMWUmV
	DS107H	S332	81/2-171/2	400-3,000	Variable	GHMWUhV
	DS107D	S442	83/8-171/2	400-3,000	Variable	GHMWUhV
	DS108D	M323	121/4	400-3,000	Variable	GHMWUmV
	DS110	M323	81/2-83/4	400-3,000	Variable	GHMWUmV
	DS110H	M323	77/8-121/4	400-3,000	Variable	GHMWUmV
	DS120H	M433	121/4	400-3,000	Variable	GHMWUhV
	DS124D	M422	171/2	400-3,000	Variable	GHMWUhV
	DS126HD	S323	16	400-3,000	Variable	GHMWUmV
	DS129D	M133	61/8	400-3,000	Variable	GHMWUhV
	DS130D	S332	81/2-121/4	400-3,000	Variable	GHMWUlV
	DS131	M343	83/4	400-3,000	Variable	GHMUhV
	DS133H	M433	121/4	400-3,000	Variable	GHMWUmV
	DS133D	M433	121/4	400-3,000	Variable	GHMWUmV
	DS136D	M333	121/4	400-3,000	Variable	GHMWUmV
	DS138	S322	121/4	400-3,000	Variable	GHMWUmV
	DS139H	M433	83/8-81/2	400-3,000	Variable	GHMWUmV
	DS141	S323	121/4	400-3,000	Variable	GHMWUmV
	DS173H	M323	63/4-81/2	400-3,000	Variable	GHMWUmV
	DS178	M323	143/4	400-3,000	Variable	GHMWUmV
	DS179D	M421	121/4	400-3,000	Variable	GHMWUmV
	DS184H	M323	81/2	400-3,000	Variable	GHMWUmV
	DS183		105/8 x 143/4			Concentric hole opener
Kingdream	B564	M333	81/2,95/8,121/4	1,000-2,500	80-600	
	BW534	M313	81/2	600-2,500	80-600	
	BW564	M333	81/2	600-2,500	80-600	
	BH541	M312	81/2,121/4	600-3,000	80-600	
	BH542	M322	81/2,121/4	600-3,000	80-600	
	BH562	M332	57/8,81/2	600-2,500	80-600	
	BH564	M333	57/8,81/2	600-2,500	80-600	
	P516	M623	6,81/2	2000-4,000	80-350	
RockBit	516D	S143	4 3/4	300-2,000	70-250	GUmMH
	518DXP	S443	77/8, 81/2,8 3/4	750-3000	70-250	GUmMH
	538D2HF	S443	57/8, 6, 61/8, 61/4	750-3000	70-250	GUmMH
	526RB	S233	77/8	500-3000	60-400	GHMVW
	KDM44RN	S333	61/4-83/4	250-4,000	80-1,000	GM
	KD4513	S233	43/4,61/8,61/4,77/	500-3000	60-400	GHMVW
	KD4613	S333	6,61/8,61/4,77/8,8	500-3000	60-400	GHMVW
	KD4819	S333	77/8,81/2,83/4,97/	500-3000	60-400	GHMVW
	KDM425	S143	33/4-47/8	250-3,000	60-300	DM
	KD4508	S343	43/4,61/8,61/4,77/	500-3000	60-400	GHMVW
	KD5608	S443	6,61/8,61/4,77/8,8	500-3000	60-400	GHMVW
	KD4713	S433	77/8,81/2,83/4,97/	500-3000	60-400	GHMVW
Security DBS	FM2844	M433	97/8	500-2,500	60-400	MVW
	FM2844	M332	121/4	500-2,500	60-400	MVW
	FM2845	M433	81/2	500-2,500	60-400	MVW
	FM2863	M323	143/4	500-2,500	60-400	MVW
	FM2865	M324	121/4	500-2,500	60-400	MVW
Varel	507	M323	121/4-143/4	500-2,000	60-400	GMW
	587	M323	81/2-121/4	500-2,000	60-400	GMW
	577	M323	81/2-121/4	500-2,000	60-400	GMW
	557	M323	77/8-121/4	500-2,000	60-400	GMW
	637	M223	77/8-83/4	500-2,000	60-400	GMW
	667	M223	77/8-83/4	500-2,000	60-400	GMW
	697	M223	77/8-83/4	500-2,000	60-400	GMW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
Varel	445	M233	57/8-83/4	500-2,000	60-400	GMW
	635	M232	61/8-63/4	500-2,000	60-400	GMW
	665	M333	77/8-83/4	500-2,000	60-400	GMW
	735	M333	77/8	500-2,000	60-400	GMW
	745	M433	81/2-83/4	500-2,000	60-400	GMW
	765	M433	77/8-97/8	500-2,000	60-400	GMW
	965	M432	121/4	500-2,500	60-400	GMW
	633	M332	41/8-61/8	500-2,500	60-400	GMW
	663	M332	57/8-61/8	500-2,500	60-400	GMW
	743	M332	57/8	500-2,500	60-400	GMW
	763	M332	57/8-63/4	500-2,500	60-400	GMW
	BP5	M432	121/4 x 105/8	500-2,500	60-400	GMW
	RD90 H	M433	41/8, 53/4, 57/8, 6, 83/8, 81/2, 83/4,	400-2,000	80-500	GIMUm
	RD90 HY	M433	41/8, 53/4, 57/8, 6, 83/8, 81/2, 83/4,	400-2,000	80-500	GIMUm
	LS427	M333	41/8, 53/4, 57/8, 6, 83/8, 81/2, 83/4,	400-2,000	80-500	GIMUm
	LS548H	M424	83/8, 81/2, 83/4,	400-2,000	80-500	GIMUm
	S280 H	M434	83/8, 81/2, 83/4,	400-2,000	80-1000	GIMNUhV
	S280 HY	M434	83/8, 81/2, 83/4,	400-2,000	80-1000	GIMNUhV
	LS328	M432	83/8, 81/2, 83/4,	400-2,000	80-1000	GIMNUhV
	LS429	M343	83/8, 81/2, 83/4,	400-2,000	80-1000	GIMNUhV
	RD1002	M432	53/4, 57/8, 6, 61/8,	400-2,000	80-500	GHIMUhV
	RD1002	M432	77/8, 83/8, 81/2,	400-2,000	80-500	GHIMUhV
	RD1001	M432	53/4, 57/8, 6, 61/8,	400-2,000	80-500	GHIMUhV
	RD1001	M432	77/8, 83/8, 81/2,	400-2,000	80-500	GHIMUhV
	LS328DR	M432	83/8, 81/2, 83/4,	400-2,000	80-1000	GIMNUhV
	XS366	M432	83/8, 81/2, 83/4,	400-2,000	80-1000	GIMNUhV
	MKF58	M432	81/2, 95/8	400-2,000	80-1000	GIMNUhV
	MKS57	M432	121/4	400-2,000	80-1000	GIMNUhV
Insert Roller Cone Bits						
RBI/Gearhart	C4	617X	43/4, 57/8, 6, 61/8,	2,500-5,500	120-40	ACEGHLM
	C4	617X	77/8,-81/2, 83/4,	2,500-5,500	120-40	ACEGHLM
	C4LRGSP	617X	43/4, 57/8, 6, 61/8,	2,500-5,500	120-40	ACEGHM
	C4LRGSP	617X	63/4, 77/8, 81/2,	2,500-5,500	120-40	ACEGHM
	C4VLRGSP	617X	43/4, 57/8, 6, 61/8,	2,500-5,500	120-40	ACEGHM
	C4VLRGSP	617X	63/4, 77/8, 81/2,	2,500-5,500	120-40	ACEGHM
	C45	617X	43/4, 57/8, 6, 61/8,	3,000-6,000	120-40	ACEGHLM
	C45	617X	77/8, 81/2, 83/4,	3,000-6,000	120-40	ACEGHLM
	C45LRGSP	617X	43/4, 57/8, 6, 61/8,	3,000-6,000	120-40	ACEGHM
	C45LRGSP	617X	63/4, 77/8, 81/2,	3,000-6,000	120-40	ACEGHM
	C47	627Y	43/4, 57/8, 6, 61/8,	3,000-6,000	120-40	ACEGHLM
	C47	627Y	77/8, 81/2, 83/4,	3,000-6,000	120-40	ACEGHLM
	C47LRGSP	627Y	57/8, 6, 61/8, 61/4,	3,000-6,000	120-40	ACEGHM
	C47LRGSP	627Y	77/8, 81/2,- 83/4,	3,000-6,000	120-40	ACEGHM
	C5	637X	43/4, 57/8, 6, 61/8,	3,000-6,000	120-40	ACEGHLM
	C5	637X	63/4, 77/8, 81/2,	3,000-6,000	120-40	ACEGHLM
	C5LRGSP	637X	43/4, 57/8, 6, 61/8,	3,000-6,000	120-40	ACEGHM
	C5LRGSP	637X	63/4, 77/8,- 81/2,	3,000-6,000	120-40	ACEGHM
	C5VL5G	637X	43/4, 57/8, 6, 61/8,	3,000-6,000	120-40	ACEGHM
	C5VL5G	637X	63/4, 77/8, 81/2,	3,000-6,000	120-40	ACEGHM
	C57	647Y	43/4, 57/8, 6, 61/8,	3,000-6,500	120-40	ACEGHLM
	C57	647Y	77/8, 81/2, 83/4,	3,000-6,500	120-40	ACEGHLM
	C57LRG	647Y	43/4, 57/8, 6, 61/8,	3,000-6,000	120-40	ACEGHM
	C57LRG	647Y	63/4, 77/8, 81/2,	3,000-6,000	120-40	ACEGHM
	B57LRGSP	647Y	41/8, 43/4, 57/8, 6,	3,000-6,000	240-40	AGHLM

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
Reed	SL61	617	6, 61/2	3,500-6,000	80-40	Y
	SL61DG	617W	6	3,500-6,000	80-40	X
	SL61DGH	617W	6 1/2	3,500-6,000	80-40	X
	SL61DHG	617W	6	3,500-6,000	80-40	X
	SL61DH	617W	6	3,500-6,000	80-40	X
	EHP61	617	6, 61/2, 81/2	3,500-6,000	80-40	Y
	EHP61A	617	6 1/4, 81/2	3,500-6,000	80-40	X
	EHP61AF	617	6 1/4	3,500-6,000	80-40	X
	EHP61ADG	617W	6 1/4, 81/2	3,500-6,000	80-40	X
	EHP61ADH	617W	81/2	3,500-6,000	80-40	X
	EHP61DH	617W	6, 81/2	3,500-6,000	80-40	X
	EHP61DGH	617W	6 1/2, 81/2	3,500-6,000	80-40	X
	EHP61DG	617W	6	3,500-6,000	80-40	X
	MHP61A	617M	83/8, 12	3,500-6,000	350-40	GMNX
	HP61	617	83/4, 97/8, 12 1/4	3,500-6,000	80-40	Y
	HP61A	617	77/8, 83/4, 12,	3,500-6,000	80-40	X
	HP61ADG	617	77/8, 83/4	3,500-6,000	80-40	X
	HP61DG	617W	83/4	3,500-6,000	80-40	Y
	HP61DH	617W	83/4, 9 7/8, 121/4	3,500-6,000	80-40	Y
	HP61ADH	617W	77/8, 8 3/4, 9 7/8,	3,500-6,000	80-40	Y
	MS62C	625M	171/2	3,500-6,000	350-40	GMNY
	MS62CDH	625M	171/2	3,500-6,000	350-40	GMNWY
	SL62	627	43/4	3,500-6,000	70-40	Y
	SL62DG	627W	4 3/4	1,000-4,000	350-60	GY
	EHP62	627	43/4, 61/8	3,500-6,000	70-40	Y
	EHP62A	627	61/8, 61/4, 61/2	3,500-6,000	70-40	X
	EHP62AF	627	61/4	3,500-6,000	70-40	X
	EHP62AFDH	627	61/2	3,500-6,000	70-40	X
	EHP62ADG	627	61/8, 61/4	3,500-6,000	70-40	X
	EHP62DG	627W	6	1,000-4,000	350-60	GY
	EHP62K	627W	4 1/2, 4 5/8, 43/4	1,000-4,000	350-60	GY
	MHP62A	627M	12	3,500-6,000	350-60	GMNX
	HP62	627	77/8, 81/2, 83/4,	3,500-6,000	70-40	Y
	HP62A	627	77/8, 81/2, 83/4, 9	3,500-6,000	70-40	X
	HP62H	627	7 7/8	3,500-6,000	70-40	X
	HP62JA	627A	77/8, 83/4	3,500-6,000	70-40	AGX
	HP62ADG	627W	8 3/4	3,500-6,000	70-40	WX
	HP62ADGH	627W	8.1/2	3,500-6,000	70-40	WX
	HP62ADH	627W	77/8, 81/2, 8 3/4,	3,500-6,000	70-40	WX
	HP62AFDH	627W	81/2	3,500-6,000	70-40	WX
	EHP63	637	57/8, 6 1/8, 61/2	3,500-6,000	70-40	Y
	EHP63DH	637	57/8, 61/2	3,500-6,000	70-40	GY
	EHP63FDH	637	61/2	3,500-6,000	70-40	GY
	EMS63C	635M	143/4	1,000-4,000	450-40	MY
	MHP63	637M	83/8	3,500-6,000	450-40	GMNX
	HP63	637	77/8, 83/8, 81/2, 9	3,500-6,000	70-40	Y
	HP63L	637	10 5/8	3,500-6,000	70-40	Y
	HP63DH	637W	8 3/8, 81/2, 8 3/4,	3,500-6,000	70-40	WY
	HP64	647	77/8, 8 1/2, 83/4, 9	3,500-6,000	70-40	Y
	HP64DG	647	83/4	3,500-6,000	70-40	Y
	HP64DH	647	8 1/2, 83/4, 9 7/8	3,500-6,000	70-40	Y
Security DBS	XT(D)40 - XT(D)45	615	131/2, 143/4, 16, 26, 28	1,000-6,000	40-150	BW
	XS(D)40 - XS(D)45	617	43/4, 57/8, 6, 61/8, 81/2, 83/4, 97/8,	1,000-6,000	40-150	BWA
	XL(D)40 - XL(D)45	617	97/8, 105/8, 121/4	1,000-6,000	40-150	BWC
	XT(D)46 - XT(D)51	625	131/2, 143/4, 16, 26, 28	1,000-6,000	40-150	BW
	XS(D)61,63, 65,67,69	647	43/4, 57/8, 6, 61/8, 81/2, 83/4, 97/8,	1,000-6,000	40-150	BW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
Smith	4GA	612X	81/2	2,000-6,000	50-80	XA
	4JS	615X	121/4-171/2	2,000-6,000	50-80	X
	F4	617X	63/4-121/4	3,000-7,000	50-160	X
	F45H	617X	77/8	3,000-7,000	50-160	X
	XR45YDDPD	617Y	6-6 1/8	2,000-6,000	40-270	YHMW
	F4A	617X	61/4	3,000-7,000	50-160	XA
	F4H	617X	77/8	3,000-7,000	50-160	X
	F4OD	617X	97/8	3,000-7,000	50-160	XW
	F47	617Y	81/2-105/8	3,000-7,000	50-160	Y
	F47A	617Y	77/8	3,000-7,000	50-160	YA
	F47OD	617Y	41/2-81/2	3,000-7,000	50-160	YW
	MF47OD	617Y	81/2	2,500-6,000	50-250	YHMW
	XR40	617X	6-63/4	2,000-6,000	40-270	XHM
	5JS	625X	121/4	2,500-5,500	50-80	X
	F5	627X	6-83/4	3,000-7,000	50-160	X
	F5OD	627X	61/2-83/4	3,000-7,000	50-160	XW
	MF5	627X	43/4	2,000-5,000	50-250	XHM
	MF5D	627X	37/8-43/4	2,000-5,000	50-250	XHMW
	XR50	627X	6-63/4	2,000-6,000	40-270	XHM
	F47H	627Y	77/8-97/8	3,000-7,500	50-160	Y
	F47HOD	627Y	77/8-83/4	3,000-7,500	50-160	YW
	XR40Y	627Y	6-63/4	2,000-6,000	40-270	YHM
	XR40YD	627Y	6-63/4	2,000-6,000	40-270	YHMW
	XR40YDDPD	627Y	6-63/4	2,000-6,000	40-270	YHMW
	M57S	635Y	171/2	2,000-4,000	50-280	YHM
	M57SD	635Y	171/2	2,000-4,000	50-280	YHMW
	M57SOD	635Y	171/2	2,000-4,000	50-280	YHMW
	F57	637Y	77/8-121/4	3,000-7,000	50-160	Y
	F57D	637Y	61/8	3,000-7,000	50-160	YW
	F57DDPD	637Y	57/8-81/2	3,000-7,000	50-160	YW
	F57OD	637Y	61/8-121/4	3,000-7,000	50-160	YW
	MF57DDPD	637Y	43/4	2,000-5,000	50-250	YHMW
	MF57OD	637Y	121/4	2,000-5,000	50-250	YHMW
	XR50Y	637Y	6-63/4	2,000-6,000	40-270	YHM
	F65OD	647X	77/8	3,000-7,000	50-110	XW
	F67	647Y	77/8-121/4	3,000-7,000	50-110	Y
	F67OD	647Y	77/8-121/4	3,000-7,000	50-110	YW
TIX	Z40G	615X	81/2	2,500-5,500	40-70	GX
	X40G	617X	55/8, 57/8, 61/4,	2,500-5,000	40-80	GX
	X40G	617X	81/2, 85/8, 95/8,	2,500-6,000	40-80	GX
	X40G	617X	151/2	2,000-5,500	40-80	GX
	X50G	627X	55/8-77/8	3,000-5,000	40-70	GX
	X50G	627X	81/2-121/4	3,000-6,000	40-70	GX
	K50G	627X	37/8, 4	1,000-2,500	40-60	GX
	X60G	637Y	55/8, 57/8	3,000-5,000	40-60	GY
	X60G	637Y	81/2, 121/4	3,000-6,000	40-60	GY
	A60	632Y	97/8, 121/4	3,000-5,500	40-60	AGY
	A60	632Y	15	2,500-5,000	40-60	AGY
Tri-Max	TM613	613	41/4-121/4	2,000-4,500	60-120	
	TM615	615	41/2-121/4	2,000-4,500	60-120	
	TM617	617	41/2-121/4	2,000-4,500	60-120	
	TM622	622	6-171/2	2,000-4,500	60-120	
	TM625	625	6-121/4	2,000-4,500	60-120	
	TM627	627	6-121/4	2,000-4,500	60-120	

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
Varel	V615	615X	171/2	3,500-6,500	80-50	
	V617	617X	55/8-171/2	3,500-6,500	80-50	
	ETD43	617Y	77/8	4,000-7,500	70-40	W
	ETD44	617X	63/4-121/4	3,500-6,000	80-50	W
	ETR44G	615X	121/4, 171/2	3,500-6,000	80-50	GW
	ETD45	627Y	77/8-83/4	4,000-7,500	70-40	W
	ETD45A	617A	61/4-83/4	3,500-5,500	80-50	AW
	V627	627X	47/8-121/4	3,500-6,000	80-50	
	ETD48	627X	43/4-121/4	4,000-6,500	75-50	W
	V635	635Y	121/4	3,500-5,500	75-40	
	V637	637Y	55/8-121/4	4,000-6,500	75-50	
	ETD55	637Y	61/8-83/4	4,000-7,000	70-40	W
	ETD55A	637A	77/8, 83/4	4,000-6,000	75-50	AW
Surface Set Diamond Coring Bits						
Baker Hughes-INTEQ	C201	D6X5	43/4-121/4	500-3,000	60-500	Dbl Cone K
	SC226	T5X8	43/4-121/4	500-3,000	60-500	Dbl Cone K
	SC777	TSR8	43/4-121/4	500-2,500	60-500	Round R
	SC712	T524	43/4-121/4	400-2,000	60-500	Low Inv GMF
Bit-Tech	CG-300F	M623	6, 61/8, 61/4, 77/8,	400-2500	50-500	AGIKM
	CN-403	M712	6, 61/8, 61/4, 77/8,	400-2500	50-500	AGKM
	CN-333G	M713	61/8, 63/16, 61/4,	400-2500	50-500	AGMR
Varel	C320	M623	57/8, 531/32, 6,	100-2,000	60-120	GIUh
	C320	M623	77/8, 83/8, 81/2,	100-2,000	60-120	GIUh
	C320 RC	M623	57/8, 531/32, 6,	100-2,000	60-120	GIUh
	C320 RC	M623	77/8, 83/8, 81/2,	100-2,000	60-120	GIUh
	C310	M734	57/8, 531/32, 6,	100-2,000	60-120	GIUh
	C310	M734	77/8, 83/8, 81/2,	100-2,000	60-120	GIUh
Surface Set Diamond Bits						
Bit-Tech	DN-423	M722	13/4, 17/8, 21/8, 61/8, 61/4, 61/2,	600-3500	60-600	ADGHMNR
	DG-420F	M622	13/4, 17/8, 21/8, 61/8, 61/4, 61/2,	600-3500	60-600	ADGHIMR
	DN-303	M713	41/2-43/4, 51/2-	600-3500	60-600	Custom
	DN-333	M713	41/2-43/4, 51/2-	600-3500	60-600	Custom
Crystal	C320	M623	57/8, 531/32, 6,	100-2,000	60-120	GIUh
	C320	M623	77/8, 83/8, 81/2,	100-2,000	60-120	GIUh
	C320 RC	M623	57/8, 531/32, 6,	100-2,000	60-120	GIUh
	C320 RC	M623	77/8, 83/8, 81/2,	100-2,000	60-120	GIUh
	C310	M734	57/8, 531/32, 6,	100-2,000	60-120	GIUh
	C310	M734	77/8, 83/8, 81/2,	100-2,000	60-120	GIUh
DPI	NM16	M613	57/8, 61/2, 6 3/4,	250-3,500	60-1,000	MT
GeoDiamond	D42	M813	4-1/2 - 4-3/4	400-2000	60-600	KMNUhV
	D54	M813	4-3/4 - 6	400-2000	60-600	KMNUhV
	D62	M613	6-1/8 - 8-1/2	400-2000	60-600	KMNUmV
	D71	M613	6 - 6-1/8	400-2000	60-600	MNUmRV
	D72	M613	3-7/8 - 12-1/4	400-2000	60-600	KMNUmV
	D73	M613	4-3/4-8-1/2	400-2000	60-600	GMNRUm
	DST12	M711	4-1/8-12-1/4	400-2000	60-600	GHMKNUm
Hycalog	342	M843	57/8, 83/8	600-3,500	Variable	GHMWINR
	343	M843	57/8, 83/8	600-3,500	Variable	GHMWINR
	344	M843	57/8, 83/8	600-3,500	Variable	GHMWINR
	345	M843	57/8, 83/8	600-3,500	Variable	GHMWINR
	810	M721	57/8-81/2	2,000-4,000	Variable	GHMKNO
	828	M721	37/8-121/4	2,000-4,000	Variable	GHMKNO
	901	M713	23/4-121/4	2,000-4,000	Variable	GHMNR
	221ND	M723	23/4-61/8	2,000-4,000	Variable	GHMWIKN
	223ND	M723	23/4-61/8	2,000-4,000	Variable	GHMWIKN

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Surface Set Diamond Bits						
Security DBS	TT521	M622	57/8, 83/8, 81/2,	300-3,000	80-1000	IMN
	TT561	M624	41/8, 43/4, 55/8,	300-3,000	80-1000	IMN
	TBT17	M634	57/8, 81/2	300-3,000	80-1000	IMN
	TB16	M713	61/2, 121/2	300-3,000	80-1000	MN
	TT593	M724	31/2, 33/4	300-3,000	80-1000	IMN
	TBT703	M734	57/8, 6, 81/2	300-3,000	80-1000	IMN
Steel Tooth Roller Cone Bits						
Industrial	M	211	43/4-151/2	4,000-8,000	40-100	
	MA	221	33/4, 41/2, 53/8,	4,000-8,000	40-100	
	MA-A	222	41/2, 51/8, 95/8	4,000-5,500	55-60	
	MADGJ	227	71/2-81/2	4,000-8,000	40-100	
	MADJ	223	71/2, 171/2	4,000-8,000	40-100	
	MAJ	221	81/2-171/2	4,000-8,000	40-100	
	MDJ	213	171/2	4,000-8,000	40-100	
	MGJ	216	53/4-121/4	4,000-8,000	40-100	
	MJ	211	73/8-227/8	4,000-8,000	40-100	
	MTA	231	41/8-171/2	4,500-8,000	45-80	
	MTA	233	71/2,143/4	4,500-8,000	45-80	
	MTA	231	53/4-171/2	4,500-8,000	45-80	
	MTA-A	232	95/8, 105/8	1,000-5,000	60-100	
	MTAD	233	53/4, 6	4,500-8,000	45-80	
	MTADGJ	237	77/8-83/8	4,500-8,000	45-80	
	MTADJ	233	71/2	4,500-8,000	45-80	
	MTAGJ	236	121/4	4,500-8,000	45-80	
	MTAJ	231	53/4-171/2	4,500-8,000	45-80	
Kingdream	GA214	214	81/2,105/8,121/4	1,000-4,000	200-80	CEGL
	GA215	215	81/2,171/2	1,000-4,000	200-80	CEGL
	H216	216	6,61/4,81/2,121/4	2,500-4,000	100-50	CEGL
	HA217	217	83/4	2,500-6,000	100-50	CEGL
TIX	MS	211	55/8, 57/8, 6, 61/8,	2,000-4,000	60-120	
	MS	211	77/8	2,000-4,000	60-120	
	MS	211	83/8, 81/2, 85/8,	2,000-5,000	60-120	
	MS	211	95/8, 97/8, 105/8,	2,000-5,000	60-120	
	MS	211	133/8, 133/4,	2,000-4,000	60-120	
	MS	211	171/2, 20, 22, 23,	2,000-4,000	60-120	
	MS-X	216	55/8, 57/8, 6, 61/8,	2,000-4,000	50-110	B
	MS-X	216	77/8	2,000-4,000	50-110	B
	MS-X	216	83/8, 81/2, 85/8,	2,000-5,000	50-110	B
	MS-X	216	95/8, 97/8, 115/8,	2,000-5,000	50-100	B
	MS-X	216	171/2	2,000-4,000	50-100	B
	MS-TX	217	57/8, 6, 61/4, 77/8	2,000-4,000	50-110	BG
	MS-TX	217	81/2, 97/8, 115/8,	2,000-5,000	50-110	BG
	MS-TZ	215	83/8, 81/2, 91/2,	2,500-5,000	60-100	G
	MS-TZ	215	121/4	2,000-5,000	60-100	G
	MS-Z	214	83/8, 81/2, 83/4,	2,000-5,000	60-100	
	MS-Z	214	97/8, 105/8, 115/8,	2,000-5,000	60-100	
	MS-Z	214	15, 171/2	2,000-4,000	50-100	
	MS-XZ	214	121/4, 171/2	2,000-5,000	60-150	
	MS-TMZ	215	16, 171/2	2,000-4,000	60-250	GM
Tri-Max	TM211	211	6-171/2	2,000-4,000	60-120	
	TM214	214	6-121/4	2,000-4,000	60-120	
	TM215	215	6-121/4	2,000-4,000	60-150	
	TM216	216	6-121/4	2,000-4,000	60-150	
	TM217	217	41/2-121/4	2,000-4,000	60-120	

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Coring Bits						
Baker Hughes -INTEQ	ARC415	M354	43/4-121/4	400-2,500	50-500	Low Inv VGMF
	ARC425	M354	43/4-121/4	400-2,500	50-500	Low Inv VGMF
	RC476	M565	43/4-121/4	400-2,300	60-500	Round
Bit-Tech	CP-440BU	M342	6, 61/8	300-2000	50-500	AFGMVW
	CP-440BU	M232	77/8, 81/2, 83/4	300-2000	50-500	AFGMVW
	CP-440	M342	77/8, 81/2, 83/4	300-2000	60-120	AFG
Crystal	C120	M432	6, 61/8, 61/2, 77/8,	100-2,000	60-120	GIUm
	C120	M432	81/2, 83/4, 97/8,	100-2,000	60-120	GIUm
	C1001	M432	6, 61/8, 61/2, 77/8,	100-2,000	60-120	GIUm
	C1001	M432	81/2, 83/4, 97/8,	100-2,000	60-120	GIUm
Security DBS	FC284	M233	6-121/4	250-3,500	90-160	F
	CD 104	M334	6-121/4	250-3,500	90-160	
	CD 202	M232	6-121/4	250-3,500	90-160	
	CMP ZI	M333	6-121/4	250-3,500	90-160	F
	FC274LI	M343	81/2-121/4	250-3,500	50-150	F
Varel	C120	M432	6, 61/8, 61/2, 77/8,	100-2,000	60-120	GIUm
	C120	M432	81/2, 83/4, 97/8,	100-2,000	60-120	GIUm
	C1001	M432	6, 61/8, 61/2, 77/8,	100-2,000	60-120	GIUm
	C1001	M432	81/2, 83/4, 97/8,	100-2,000	60-120	GIUm
	CS58	M132	81/2 x 4	400-2,000	80-1000	GIMNUhV
Fish Tail Bits						
Bit-Tech	DP-440-B1P	M131	61/4	300-2000	100-500	ADGMVW
GeoDiamond	M58	M131	3-5/8-8-1/2	100-2000	60-200	GMNUIVW
Security DBS	FM2563	M221	63/4	500-2,500	60-400	MVW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Medium-Hard						
Surface Set Diamond Coring Bits						
Baker Hughes-INTEQ	SC226	T5X8	43/4-121/4	500-3,000	80-500	Dbl Cone K
	SC278	T2X9	43/4-121/4	750-3,500	80-500	Round K
	SC777	TSR8	43/4-121/4	500-2,500	80-500	Round R
	SC279	DSR0	43/4-121/4	500-2,500	80-500	Round R
	SC281	NA	43/4-121/4	500-2,500	80-500	Round R
Bit-Tech	CN-424BL	M842	61/8, 63/4	400-2500	50-500	AGMR
	CN-404RS	M812	61/8, 77/8, 81/2,	400-2500	50-500	AGKM
	CG-300PG	M623	6, 61/8, 61/4, 77/8,	400-2500	50-500	AGIKM
	CN-404G	M612	6, 61/8, 61/4, 77/8,	400-2500	50-500	AGKM
	CN-334G	M813	61/8, 63/16, 61/4,	400-2500	50-500	AGRM
Crystal	C200	M613	57/8, 531/32, 6,	100-2,000	60-120	GKUh
	C200	M613	77/8, 83/8, 81/2,	100-2,000	60-120	GKUh
	C200 DF	M613	57/8, 531/32, 6,	100-2,000	60-120	GFKUh
	C200 DF	M613	77/8, 83/8, 81/2,	100-2,000	60-120	GFKUh
	C300	M713	57/8, 531/32, 6,	100-2,000	60-120	GKUh
	C300	M713	77/8, 83/8, 81/2,	100-2,000	60-120	GKUh
	C300 DF	M713	57/8, 531/32, 6,	100-2,000	60-120	GFKUh
	C300 DF	M713	77/8, 83/8, 81/2,	100-2,000	60-120	GFKUh
Security DBS	CT 303	M623	6-121/4	250-3,500	110-150	I
	CT 313	M623	6-121/4	250-3,500	110-150	W
	CT 103	M623	6-121/4	250-3,500	110-150	I
	CT 403	M624	6-121/4	250-3,500	110-150	I
	CT 93	M623	6-121/4	250-3,500	110-150	I
Varel	C200	M613	57/8, 531/32, 6,	100-2,000	60-120	GKUh
	C200	M613	77/8, 83/8, 81/2,	100-2,000	60-120	GKUh
	C200 DF	M613	57/8, 531/32, 6,	100-2,000	60-120	GFKUh
	C200 DF	M613	77/8, 83/8, 81/2,	100-2,000	60-120	GFKUh
	C300	M713	57/8, 531/32, 6,	100-2,000	60-120	GKUh
	C300	M713	77/8, 83/8, 81/2,	100-2,000	60-120	GKUh
	C300 DF	M713	57/8, 531/32, 6,	100-2,000	60-120	GFKUh
	C300 DF	M713	77/8, 83/8, 81/2,	100-2,000	60-120	GFKUh
	C320	M623	57/8, 531/32, 6,	100-2,000	60-120	GIUh
	C320	M623	77/8, 83/8, 81/2,	100-2,000	60-120	GIUh
	C320 RC	M623	57/8, 531/32, 6,	100-2,000	60-120	GIUh
	C320 RC	M623	77/8, 83/8, 81/2,	100-2,000	60-120	GIUh
	C310	M734	57/8, 531/32, 6,	100-2,000	60-120	GIUh
	C310	M734	77/8, 83/8, 81/2,	100-2,000	60-120	GIUh
Surface Set Diamond Bits						
Bit-Tech	DN-424G	M812	13/4, 1/7/8, 21/8,	300-3500	60-600	ADGHMNR
	DN-424G	M812	41/2, 43/4, 61/8,	300-3500	60-600	ADGHMNR
	DG-420PG	M622	13/4, 17/8, 21/8,	300-3500	60-600	ADGHIMR
	DG-420PG	M622	41/2, 43/4,61/8,	300-3500	60-600	ADGHIMR
	DN-304G	M813	41/2-43/4, 51/2-	Variable	Variable	Custom
	DN-334G	M813	41/2-43/4, 51/2-	Variable	Variable	Custom
Crystal	M311	M734	83/8, 81/2, 121/4	400-2500	80-1000	GIMNUm
	M320	M624	41/8, 53/4, 57/8, 6,	400-2500	80-1000	GIMNUm
	M320	M624	83/8, 81/2, 83/4,	400-2500	80-1000	GIMNUm
	M320 RC	M624	41/8, 53/4, 57/8, 6,	400-2500	80-1000	GIMNUh
	M320 RC	M624	83/8, 81/2, 83/4,	400-2500	80-1000	GIMNUh
	M340	M624	41/8, 53/4, 57/8, 6,	400-2500	80-1000	GIMNUm
	M340	M624	83/8, 81/2, 83/4,	400-2500	80-1000	GIMNUm
	M340 RC	M624	41/8, 53/4, 57/8, 6,	400-2500	80-1000	GIMNUh
	M340 RC	M624	83/8, 81/2, 83/4,	400-2500	80-1000	GIMNUh
	H200	M613	41/8, 53/4, 57/8, 6,	400-2500	80-1000	GMNUh
	DK320	M631	53/4, 57/8, 6, 61/8,	400-2500	80-500	DGHIMUh
	DK320	M631	77/8, 83/8, 81/2,	400-2500	80-500	DGHIMUh
	DK320 RC	M631	53/4, 57/8, 6, 61/8,	400-2500	80-500	DGHIMUh
	DK320 RC	M631	77/8, 83/8, 81/2,	400-2500	80-500	DGHIMUh

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Surface Set Diamond Bits						
DPI	NM16	M613	57/8, 61/2, 81/2	250-3,500	60-1,000	MN
	N26ST	M711	43/4, 61/2, 83/4	250-3,500	60-1,000	MN
	NM55	M713	41/8, 43/4, 6, 81/2	250-3,500	60-1,000	MN
	NM33	M713	57/8, 6, 81/2,			
GeoDiamond	D51	M614	37/8-121/4	800-4,000	80-500	MNR
	D52	M614	37/8-121/4	800-4,000	80-500	MNK
	D53	M714	37/8-121/4	800-4,000	80-500	MNR
	D54	M713	37/8-61/2	800-4,000	80-500	MNKMN
	D62HT	M613	6-81/2	200-5,000	100-500	MNKMN
	D71	M613	37/8-121/4	800-4,000	80-500	MNR
	XTN35	M842	33/4-121/4	400-2,000	60-600	GMNUmVW
	XTS39	M842	57/8	400-2,000	60-600	GMNUmVW
Hughes	S225	M633	43/4-121/4	300-3,000	100-500	MNIW
	S226	M723	43/4-121/4	300-3,000	100-500	MIW
	S248	M723	43/4-121/4	300-3,000	100-500	MIW
	S276	M772	43/4-121/4	300-3,000	100-500	MIR
	S725	M622	43/4-121/4	300-3,000	100-500	MIR
	D331	M714	41/8-121/4	500-4,000	75-500	
	D41	M812	43/4-121/4	1,000-4,000	75-500	MK
	T51	M714	77/8-121/4	625-4,000	400-1,000	MNK
Hycalog	340	M843	6-81/2	600-3,500	Variable	GHMWINR
	342	M843	57/8-83/8	600-3,500	Variable	GHMWINR
	343	M843	57/8-121/4	600-3,500	Variable	GHMWINR
	344	M843	57/8-83/8	600-3,500	Variable	GHMWINR
	345	M843	57/8-83/8	600-3,500	Variable	GHMWINR
	432	M843	81/2	1,000-4,000	Variable	GHMNR
	433	M843	81/2	1,000-4,000	Variable	GHMNR
	810	M721	57/8-81/2	2,000-4,000	Variable	GHMKNO
	828	M721	37/8-121/4	2,000-4,000	Variable	GHMKNO
	901	M713	23/4-121/4	2,000-4,000	Variable	GHMNR
	221ND	M723	23/4-77/8	2,000-4,000	Variable	GHMWIKN
	223ND	M723	6-81/2	2,000-4,000	Variable	GHMWIKN
Security DBS	CT 303	M623	6-121/4	250-3,500	110-150	I
	CT 313	M623	6-121/4	250-3,500	110-150	W
	CT 103	M623	6-121/4	250-3,500	110-150	I
	CT 403	M624	6-121/4	250-3,500	110-150	I
	CT 93	M623	6-121/4	250-3,500	110-150	I
Varel	M311	M734	83/8, 81/2, 121/4	400-2500	80-1000	GIMNUm
	M320	M624	41/8, 53/4, 57/8, 6,	400-2500	80-1000	GIMNUm
	M320	M624	83/8, 81/2, 83/4,	400-2500	80-1000	GIMNUm
	M320 RC	M624	41/8, 53/4, 57/8, 6,	400-2500	80-1000	GIMNUh
	M320 RC	M624	83/8, 81/2, 83/4,	400-2500	80-1000	GIMNUh
	H200	M613	41/8, 53/4, 57/8, 6,	400-2500	80-1000	GMNUh
	DK320	M631	53/4, 57/8, 6, 61/8,	400-2500	80-500	DGHIMUh
	DK320	M631	77/8, 83/8, 81/2,	400-2500	80-500	DGHIMUh
	DK320 RC	M631	53/4, 57/8, 6, 61/8,	400-2500	80-500	DGHIMUh
	DK320 RC	M631	77/8, 83/8,	400-2500	80-500	DGHIMUh
Steel Tooth Roller Cone Bits						
Hughes	ATJ-4	216	43/4, 57/8, 6, 61/8	3,000-7,000	90-50	
	ATJ-G4	217	77/8, 83/4	3,000-7,000	90-50	G
	DR5	221	33/4, 37/8, 41/8,	2,500-6,000	150-50	
Kingdream	H217	217	6,81/2,121/4	2,500-6,000	100-50	CEGL
	HA217	217	6,81/2,121/4	2,500-6,000	100-50	CEGL
Reed	HP21G	217	81/2,121/4	3,500-6,000	100-40	YG
Security DBS	XN4	211	43/4, 57/8, 6, 61/8,	1,000-5,000	80-160	
	XN4	211	61/2, 63/4, 77/8,	1,000-5,000	80-160	
	XS4	217	43/4, 57/8, 6, 61/8,	1,000-5,000	80-160	
	XS4	217	61/2, 63/4, 77/8,	1,000-5,000	80-160	
	XL4	217	97/8, 105/8, 121/4	1,000-5,000	80-160	

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Steel Tooth Roller Cone Bits						
Smith	V2J	211	57/8-61/8	2,000-5,000	50-160	
	SVH	215	83/8-171/2	2,000-5,000	50-160	
	FV	216	57/8-12	2,000-5,000	50-160	
	FVH	217	81/2	2,000-5,000	50-160	
TIX	MH	231	3, 31/4, 37/8, 4,	1,500-2,500	40-60	
	MH	231	45/8, 43/4, 5, 51/8	1,500-3,000	40-60	
	MH	231	55/8, 57/8, 6, 61/8,	2,000-4,500	60-100	
	MH	231	75/8, 77/8	2,000-4,500	60-100	
	MH	231	83/8, 81/2, 85/8,	2,500-5,500	60-100	
	MH	231	105/8, 103/4, 11,	2,500-5,500	60-100	
	MH	231	121/4	2,500-5,500	60-100	
	MH	231	133/8, 143/4, 15,	2,500-4,500	60-100	
	MH	231	22, 23, 24, 26	2,500-4,000	60-100	
	MH-X	236	55/8, 57/8, 6, 75/8	2,000-4,500	50-90	B
	MH-X	236	81/2, 121/4	2,500-5,500	50-90	B
	MH-TX	237	57/8, 6	2,000-4,500	50-90	BG
	MH-TX	237	81/2, 121/4	2,500-5,500	50-90	BG
	MH-TZ	235	81/2, 121/4	2,500-5,500	50-80	G
	MH-Z	234	81/2, 91/2, 121/4	2,500-5,500	50-80	
	MH-XZ	234	121/4, 171/2	2,500-5,500	50-150	
Tri-Max	TM223	223	6-121/4	2,000-5,000	60-120	
	TM231	231	6-121/4	2,000-5,000	60-120	
Varel	L2	211S	25/8-171/2	2,500-6,500	150-50	S
	L211	211S	55/8-26	2,500-6,500	150-50	S
	L214	214S	81/2, 121/4, 171/2	2,500-6,500	140-50	S
	L215	215S	81/2, 115/8, 121/4,	2,500-6,500	140-50	S
	L216	216S	37/8-121/4	2,500-7,000	120-50	S
	L217	217S	57/8, 6, 81/2,	2,500-7,000	120-50	S
	LH2	231S	215/16-20	3,000-6,500	120-50	S
	L231	231S	121/4, 143/4, 15,	3,000-6,500	120-50	S
	L235	235S	143/4	3,000-6,500	120-50	S
	L237	237S	6	3,000-6,500	120-50	S
PDC Drill Bits						
BBL Brit Bit	BB457X	O423	55/8-63/4	2,500	Any	GKMNQUhV
	BB480X	O333	43/4	2,000	Any	HKMNQUhV
	BB657X	O423	83/8-121/4	3,500	Any	HKMNQUhV
	BB658X	O423	83/8-121/4	3,500	Any	HKMNQUhV
	BB678X	O333	121/4	3,500	Any	HKMNQUhV
	BB880X	O433	55/8-61/8	2,500	Any	HKMNQUhV
	BB1280X	O433	81/2	4,000	Any	HKMNQUhV
	BB1280MR	M433	81/2	4,000	Any	HKMNQUhV
	BB1281X	O619	83/8-81/2	4,000	Any	HKMNQUhV
	BB1290X	O619	83/8-81/2	4,000	Any	HKMNQUhV
Bit-Tech	HP-440-B	M342	31/2, 35/8, 33/4,	200-3000	200-1000	ADFGHMNV
	HP-440-B	M342	41/2,43/8, 43/4,	200-3000	200-1000	ADFGHMNV
	HP-440-B13	M232	6, 61/8, 61/4, 61/2,	200-3000	60-600	ADGHMVW
	DP-440-B2U	M242	77/8, 81/2, 83/4	400-3000	60-600	ADGMVW
Crystal	LS319	M343	53/4, 57/8, 6, 61/8,	400-2,000	80-500	GHIMUhV
	LS319	M343	77/8, 83/8, 81/2,	400-2,000	80-500	GHIMUhV
	RD1002	M432	53/4, 57/8, 6, 61/8,	400-2,000	80-500	GHIMUhV
	RD1002	M432	77/8, 83/8, 81/2,	400-2,000	80-500	GHIMUhV
	RD1001	M432	53/4, 57/8, 6, 61/8,	400-2,000	80-500	GHIMUhV
	RD1001	M432	77/8, 83/8, 81/2,	400-2,000	80-500	GHIMUhV
	RD1001 RC	M432	53/4, 57/8, 6, 61/8,	400-2,000	80-500	GHIMUhV
	RD1001 RC	M432	77/8, 83/8, 81/2,	400-2,000	80-500	GHIMUhV

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
DPI	MP39	M442	41/8,- 41/4, 43/4,			
	MP37	M343	41/4, 43/4			
	MP46	M333	53/4, 61/4, 6, 61/2,			
	MP47	M333	6, 61/4, 61/2, 77/8,			
	MP48	M433	6, 61/4, 61/2, 83/8,			
	MP49	M433	6, 61/4, 61/2			
	MP67	M323	77/8, 81/2, 83/4,			
	MP68	M423	77/8, 91/2			
	MP69	M423	77/8, 81/2, 83/4			
	SP48	S433	77/8			
	SP68	S423	77/8			
	SP69	S423	81/2			
	SP45	S233	97/8			
	SD946	S423	77/8, 81/2			
	SR(F)744		6 x 61/2			
	ST49	S433	61/2	200-3,500	60-450	DHKMV
	ST37	S342	61/2	200-3,500	60-450	DHKMV
	MT37	M342	41/2, 43/4, 57/8, 6,	200-3,500	60-450	DHKMV
	ST46	S332	77/8	200-3,500	60-450	DHKMV
	ST47	S332	6-81/2	200-3,500	60-450	DHKMV
	MT47	M332	61/8, 61/2, 63/4,	200-3,500	60-450	DHKMV
	ST67	S322	77/8, 81/2, 83/4	200-3,500	60-450	DHKMV
	MT46	M332	61/8, 81/2, 83/4,	200-3,500	60-450	DHKMV
	SC67	S323	81/2, 121/4	200-3,500	60-450	DHKMV
	MC67	M323	81/2, 83/4, 97/8,	200-3,500	60-450	DHKMV
	MT49	M432	57/8, 6, 61/8, 61/4,	200-3,500	60-450	DHKMV
	SC47	S332	81/2	200-3,500	60-450	DHKMV
	SC69	S423	6-81/2	200-3,500	60-450	DHKMV
	SS47	S332	61/8, 61/4	200-3,500	60-450	DHKMV
	SS67	S323	97/8	200-3,500	60-450	DHKMV
	SS69	S423	6, 61/4, 77/8	200-3,500	60-450	DHKMV
	SR(F)533 Bi-Center		33/4 x 41/4, 33/4 x	250-3,000	60-200	DGHKMV
	SR(F)544 Bi-Center		43/4 x 55/8, 6 x 7	250-3,000	60-200	DGHKMV
	MC48	M433	83/8 - 81/8	200-3,500	60-450	DHKMV
	MC49	M433	41/8-83/4	200-3,500	60-450	DHKMV
	MT67	M322	81/2	200-3,500	60-450	DHKMV
	ST66	S322	77/8	200-3,500	60-450	DHKMV
	SD47	S333	61/2-105/8			DGHKMV
	SD67	S323	77/8			DGHKMV
GeoDiamond	BC22 Bi-Center	S243	6x7-81/2x97/8	400-2,000	60-600	GMNUmVW
	BC25 Bi-Center	S343	41/8x43/4	400-2,000	60-600	GMNUmVW
	M16	M442	57/8-121/4	400-3,000	60-600	GMNUhVW
	M20	M442	41/8-63/4	400-3700	60-600	GMNUmVW
	M22	M432	81/2	400-4,000	60-600	GMNUmVW
	M33	M432	57/8-171/2	400-4,000	60-600	GMNUmVW
	M27	M432	33/4	400-4,000	60-600	GMNUlVW
	M34	M433	81/2-121/4	400-2800	60-600	GMNUhVW
	M35	M433	143/4	400-3,000	60-600	GMNUhVW
	M36	M433	83/8-121/4	400-2800	60-600	GMNUhVW
	M37	M433	75/8-121/4	400-2,000	60-600	GMNUhVWA
	M39	M333	77/8-83/4	400-2,000	60-600	GMNUhVW
	M40	M333	61/2-97/8	400-2,000	60-600	GMNUmVW
	M41	M333	97/8	400-2,000	60-600	GMNUmVW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
GeoDiamond	M42	M333	77/8-121/4	400-2,000	60-600	GMNUmVW
	M44	M423	61/8-63/4	400-2,000	60-600	GMNUmVW
	M50	M333	6-121/4	400-2,000	60-600	GMNUmVW
	M53	M232	57/8-81/2	400-2,000	60-600	GMNUmVW
	M61	M423	16	400-2,000	60-600	GMNUmVW
	M64	M223	121/4	400-2,000	60-600	GMNUmVW
	M68	M423	121/4-171/2	400-2,000	60-600	GMNUmVW
	M69	M223	77/8-121/4	400-2,000	60-600	GMNUmVW
	M71	M323	105/8-121/4	400-2,000	60-600	GMNUmVW
	M88F	M223	81/2	400-2,000	60-600	GMNUmVW
	MA32	M432	57/8-143/4	400-2,000	60-600	GMNUmVW
	MA62	M423	57/8-171/2	400-2,000	60-600	GMNUmVW
Hughes	BD536H	M423	77/8 - 171/2	300-3,000	60-300	W
	BD547	M423	77/8 - 171/2	300-3,000	60-300	W
	BD437	M433	77/8-121/2	500-3,500	60-240	MNW
	BD447	M433	77/8 - 171/2	300-3,000	60-350	GW
	BD449	M433	77/8 - 171/2	300-3,000	60-350	W
	BX449	M433	43/4 - 171/2	300-3,000	60-350	MW
	BD449	M433	77/8 - 171/2	300-3,000	60-300	GW
	BD445P	M432	77/8 - 171/2	300-3,000	60-350	GW
	ABD547	M423	77/8 - 171/2	300-3,000	60-300	VW
	BD559	M423	77/8 - 171/2	300-3,000	100-300	GW
	BD60ST	M432	6 1/4	300-3,000	60-300	GW
	AG545	M323	81/2-171/2	300-3,000	60-240	MVW
	G545	M323	81/2-171/2	300-3,000	60-240	MW
	G547	M423	121/4-171/2	300-3,000	60-240	MW
	G418	M433	121/4	400-3,500	80-750	MDW
	AG437	M433	77/8-121/4	500-3,500	60-240	MDVW
	G447	M433	15-Jun	500-3,500	60-240	MNW
	G449	M433	6-121/4	500-3500	80-500	MNW
	G458	M433	121/4	500-3500	80-500	MNW
Hycalog	DS70D	M443	121/4-171/2	450-3,200	Variable	GHMWUhV
	DS71	S323	53/4-121/4	450-3,200	Variable	GHMWNUhV
	DS83	S223	121/4	450-3,200	Variable	GHMWUhV
	DS84	M432	6-121/4	450-3,200	Variable	GHMWNUhV
	DS85H	S433	83/8-81/2	450-3,200	Variable	GHMWUhV
	DS92D	S334	171/2	450-3,200	Variable	GHMWUhV
	DS94D	M434	77/8-171/2	450-3,200	Variable	GHMWUhV
	DS111H	M443	33/4-83/4	450-3,200	Variable	GHMWNUhV
	DS111D	M443	63/4-81/2	450-3,200	Variable	GHMWNUhV
	DS112	M443	91/2-105/8	450-3,200	Variable	GHMWUhV
	DS113H	M333	97/8-121/4	450-3,200	Variable	GHMWUhV
	DS113D	M333	12-121/4	450-3,200	Variable	GHMWUhV
	DS114	M343	83/4	450-3,200	Variable	GHMUhV
	DS120D	M433	121/4	450-3,200	Variable	GHMWUhV
	DS137H	M432	121/4	450-3,200	Variable	GHMWUhV
	DS137D	M432	121/4	450-3,200	Variable	GHMWUhV
	DS142	S332	105/8-171/2	450-3,200	Variable	GHMWUhV
	DS143H	M332	57/8-6	450-3,200	Variable	GHMWUhV
	DS144	M432	97/8	450-3,200	Variable	GHMWUhV
	DS146	M332	77/8-83/4	450-3,200	Variable	GHMWUhV
	DS148D	M433	81/2	450-3,200	Variable	GHMWUhV
	DS152HD	S443	81/2 x 97/8-141/2	450-3,200	Variable	GHMWUhV
	DS163HD	M432	81/2-121/4	450-3,200	Variable	GHMWUhV
	DS168HD	M433	81/2	450-3,200	Variable	GHMWUhV
	DS168D	M433	81/2	450-3,200	Variable	GHMWUhV
	DS173D	M423	63/4	450-3,200	Variable	GHMWUhV
	DS176H	M423	105/8	450-3,200	Variable	GHMWUhV

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
Kingdream	B665	M433	121/4	500-2,000	250-1400	
	B668	M434	63/4,81/2,121/4	500-2,000	250-1400	
	B669	M434	81/2,91/2,121/4	1,000-3,000	80-600	
	P733	M722	63/4,81/2	1,500-3,000	60-350	
	D526	M613	6,81/2	2,000-4,000	80-350	
	D625	M613	6,81/2	2,000-4,000	80-350	
RockBit	KD5708	S443	6,61/8,61/4,77/8,8	500-3000	60-400	GHMVW
	KD5813	S443	6,61/8,61/4,77/8,8	500-3000	60-400	GHMVW
	KD5913	S443	81/2,83/4,97/8,121	500-3000	60-400	GHMVW
Security DBS	FM2643i	M343	51/2-6	500-3,000	100-400	VWM
	FM2762i	M322	121/4	500-3,500	100-400	VWM
	FM2843i	M343	121/4	500-3,500	100-400	VWM
	SE3641i	M342	53/4-81/2	500-3,000	100-400	DVWM
Tri-Max	Q-1H	S546	81/2-121/4	1,000-3,500	80-120	MDG
	SM-1H	S877	41/2-121/4	1,000-3,500	80-120	DG
	HZ-90H	S977	41/2-81/2	1,000-3,500	80-200	HMD
Varel	635	M232	61/8-63/4	500-2,000	60-400	GMW
	665	M333	77/8-83/4	500-2,000	60-400	GMW
	735	M333	77/8	500-2,000	60-400	GMW
	745	M433	81/2-83/4	500-2,000	60-400	GMW
	765	M433	77/8-97/8	500-2,000	60-400	GMW
	965	M432	121/4	500-2,500	60-400	GMW
	633	M332	41/8-61/8	500-2,500	60-400	GMW
	663	M332	57/8-61/8	500-2,500	60-400	GMW
	743	M332	57/8	500-2,500	60-400	GMW
	763	M332	57/8-63/4	500-2,500	60-400	GMW
	LS319	M343	53/4, 57/8, 6, 61/8,	400-2,000	80-500	GHIMUhV
	LS319	M343	77/8, 83/8, 81/2,	400-2,000	80-500	GHIMUhV
	RD1002	M432	53/4, 57/8, 6, 61/8, 81/2, 83/4, 97/8,	400-2,000	80-500	GHIMUhV
	RD1001	M432	53/4, 57/8, 6, 61/8,	400-2,000	80-500	GHIMUhV
	RD1001	M432	77/8, 83/8, 81/2,	400-2,000	80-500	GHIMUhV
	RD1001 RC	M432	53/4, 57/8, 6, 61/8,	400-2,000	80-500	GHIMUhV
	RD1001 RC	M432	77/8, 83/8, 81/2,	400-2,000	80-500	GHIMUhV
	MSF59	M433	81/2, 121/4	400-2,000	80-1000	GIMNUhV
	MKF39	M432	6, 81/2	400-2,000	80-1000	GIMNUhV
	MKS58	M332	57/8	400-2,000	80-1000	GIMNUhV
PDC Coring Bits						
Baker Hughes-INTEQ	ARC325	NA	55/8-81/2	2750-3800	50-500	Low Inv VGMF
	ARC425	M354	43/4-121/4	400-2,500	50-500	Low Inv VGMF
	ARC427	M355	43/4-121/4	500-3,000	50-500	Low Inv VGMF
	RC478	M565	43/4-121/4	500-3,000	60-500	Round
Bit-Tech	CP-440BU	M342	6, 61/8	300-2000	50-500	AFGMVW
	CP-440BU	M232	77/8, 81/2, 83/4	300-2000	50-500	AFGMVW
	CP-440P	M342	77/8, 81/2, 83/4	300-2000	60-120	AFG
Kingdream	PC733	M722	57/8,81/2	1,500-2,500	60-500	
Security DBS	FC284LI	M343	81/2-121/4	250-3,500	50-150	F
	FCi264LI	M343	81/2-121/4	250-3,500	50-150	F

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
Hughes	MX-50R	637	91/2	3,000-7,000	90-50	BGMW
	HR-50	637	77/8, 83/4	3,000-7,000	90-50	GW
	HR-50R	637	77/8, 81/2, 83/4	3,000-7,000	90-50	GW
	HR-50RG	637	81/2	3,000-7,000	90-50	GW
	HR-66	647	77/8, 83/4	3,000-7,000	90-50	GW
	STX-60	637	61/8	3,000-7,000	90-50	GW
	STR-50	637	33/4, 37/8, 43/4,	3,000-7,000	90-50	GW
	STR-50	637	6, 61/8, 61/4, 61/2	3,000-7,000	90-50	GW
	STR-50DX	637	61/8	3,000-7,000	90-50	GW
	STR-50FDX	637	61/8	3,000-7,000	90-50	GW
	STR-50R	637	61/8, 61/2	3,000-7,000	90-50	GW
	ATJ-66	637	77/8, 83/4, 97/8	3,000-7,000	90-50	
Kingdream	H617	617	81/2	3,500-6,000	60-45	CEGL
	HA617	617	6,81/2,91/2,121/4	2,500-6,000	80-40	CEGL
	H637	637	121/4	4,000-6,000	55-45	CEGL
	HA637	637	6,81/2,91/2,121/4	3,500-6,000	70-40	CEGL
	HJT637	637	8 1/2	2,500-6,000	200-40	HGL
Tri-Max	TM622	622	6-121/4	3,000-5,000	60-100	
	TM625	625	6-171/2	3,000-5,000	60-100	
	TM627	627	6-121/4	3,000-5,000	60-100	

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Soft and Sticky						
Steel Tooth Roller Cone Bits						
Hughes	MX-X1	117	77/8, 81/2, 83/4,	1,000-4,000	300-80	BGMW
	MX-X3	137	81/2, 121/4	1,000-4,000	300-80	BGMW
	MX-1	117	77/8, 81/2, 83/4,	1,000-4,000	300-80	BGMW
	MX-3	137	81/2, 12 1/4	1,000-4,000	300-80	BGMW
	MAX-GT1	115	14 3/4	1,000-4,000	350-80	BCGW
	XLX-1	117	77/8, 81/2, 83/4,	1,000-4,000	350-80	GW
	STX-1	117	6, 61/8	2,000-4,000	250-80	GHW
	STR-1	116	41/8, 41/2, 43/4,	2,000-4,000	250-80	GHW
	GT-1	116	6, 61/8, 61/4 ,	2,000-5,000	180-80	W
	GT-1	116	81/2, 83/4, 91/2,	2,000-5,000	180-80	W
	GT-G1H	117	77/8	2,000-5,000	180-80	W
	GTX-1	114	121/4, 131/2,	2,000-5,000	180-80	W
	GTX-3	134	30	2,000-5,000	180-80	W
	GTX-G1	115	121/4, 141/2,	1,500-4,000	200-80	GW
	GTX-G3	135	83/8, 81/2, 121/4,	1,500-4,000	200-80	GW
	R1	111	11, 121/4, 131/2,	2,000-5,000	250-60	
	R1	111	171/2, 20, 22, 23,	2,000-5,000	250-60	
	R3	131	22, 26, 28	2,000-5,000	250-60	
Industrial	S	121	55/8-26	3,500-5,500	70-120	
	S	126	71/2-121/4	3,500-5,000	70-120	
	S	122	95/8, 105/8	1,000-3,000	85-100	
	SGJ	116	71/2-121/4	3,500-5,500	70-120	
	SJ	111	55/8-20	3,500-5,500	70-120	
	SL12	126	6-121/4	2,000-4,000	40-100	
Kingdream	W111	111	121/4,171/2,	1,000-4,000	200-80	CEGL
	W121	121	121/4,171/2,	1,000-4,000	200-80	CEGL
	W131	131	121/4,171/2,	1,000-4,000	200-80	CEGL
	GA114	114	81/2, 171/2, 121/4	1,500-4,000	200-80	CEGL
	GA115	115	81/2, 121/4	1,500-4,000	200-80	CEGL
	GAT115	115	171/2	1,500-4,000	200-80	CEGL
	GJ115	115	121/4,171/2,	1,500-4,000	350-80	CEGL
	GJT115	115	171/2	1,000-4,000	350-80	CEGL
	H116	116	81/2, 91/2, 121/4	2,000-5,000	150-80	CEGL
	HA116	116	81/2, 91/2, 121/4	2,000-5,000	150-80	CEGL
	HAT117	117	121/4	2,000-5,000	180-80	CEGL
	H117	117	81/2	2,000-5,000	150-80	CEGL
	HJ117	117	121/4	2,000-5,000	300-80	CEGL
	HJT117	117	121/4	2,000-5,000	300-80	CEGL
	GA125	125	171/2	1,000-4,000	200-60	CEGL
	H126	126	81/2, 83/8, 91/2,	2,000-5,000	150-60	CEGL
	HA126	126	81/2, 83/8, 91/2,	2,000-5,000	150-60	CEGL
	H127	127	81/2, 83/8, 91/2,	2,000-5,000	150-60	CEGL
	HAT127	127	77/8,81/2	2,000-5,000	180-80	CEGL
	FAT127	127	81/2	2,000-5,000	250-60	CEGL
	HJT127	127	121/4	2,000-5,000	300-80	CEGL
	HFT127	127	81/2	1,000-5,000	250-60	CEGL
	GA134	134	81/2,171/2	1,500-4,000	200-80	CEGL
	GA135	135	81/2,171/2	1,500-4,000	200-80	CEGL
	GJ135	135	121/4,171/2	1,000-4,000	350-80	CEGL
	H136	136	57/8,6,81/2,83/4,1	2,000-6,000	120-60	CEGL
	HA136	136	57/8,6,81/2,83/4,1	2,000-6,000	120-60	CEGL
	H137	137	81/2,121/4	2,000-6,000	120-60	CEGL
	HAT137	137	77/8,81/2	2,000-5,000	180-80	CEGL
	HJT137	137	121/4	2,000-5,000	300-80	CEGL

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Steel Tooth Roller Cone Bits						
RBI/Gearhart	SS1G	117	57/8, 6, 61/8, 61/4,	1,000-5,000	350-60	CEGHLM
	SS1G	117	77/8, 81/2, 83/4,	1,000-5,000	350-60	CEGHLM
	SS1G	115	171/2, 20, 22, 24,	1,000-5,000	350-60	CEGHLM
	SS1LRG	117	43/4, 55/8, 57/8, 6,	1,000-5,000	350-60	CEGHM
	SS1LRG	117	63/4, 77/8, 81/2,	1,000-5,000	350-60	CEGHM
	SS1LRG	115	171/2, 20, 22, 24,	1,000-5,000	350-60	CEGHM
	SS2G	127	57/8, 6, 61/8, 61/4,	1,000-5,000	350-60	CEGHLM
	SS2G	127	77/8, 81/2, 83/4,	1,000-5,000	350-60	CEGHLM
	SS2G	125	171/2, 20, 22, 24,	1,000-5,000	350-60	CEGHLM
	SS2LRG	127	57/8, 6, 61/8, 61/4,	1,000-5,000	350-60	CEGHM
	SS2LRG	127	77/8, 81/2, 83/4,	1,000-5,000	350-60	CEGHM
	SS2LRG	125	171/2, 20, 22, 24,	1,000-5,000	350-60	CEGHM
	SG3LRG	135	171/2	1,000-5,000	350-60	CEGHM
Reed	Y11	111	121/4, 131/2, 13	1,000-3,000	250-60	SC
	Y11	111	14 3/4, 171/2, 20,	1,000-3,000	250-60	SC
	EMS11GC	115M	131/2, 143/4, 16,	1,000-3,000	350-60	CGMN
	EMS11GC	115M	171/2, 181/2, 22,	1,000-3,000	350-60	CGMN
	EMS11GT	115M	12 1/4	1,000-3,000	350-60	CGMN
	EMS11CDH	115M	16, 171/2	1,000-3,000	350-60	CGMN
	HP11	116	77/8, 81/2, 83/4,	1,000-5,000	200-60	S
	EHT11	116W	7 7/8, 81/2, 83/4,	1,000-5,000	200-60	SW
	EHT11G	116W	81/2, 83/4, 91/2, 9	1,000-5,000	200-60	SW
	SL11T	116W	6 1/2	1,000-5,000	200-60	SW
	MHT11G	117M	81/2, 121/4	1,000-3,500	300-60	MG
	MHT11GT	117M	81/2, 9 7/8	1,000-3,500	300-60	MG
	MHT11DH	117M	121/4	1,000-3,500	300-60	MGW
	Y12	121	24	1,000-5,000	250-60	S
	EHT12	126W	57/8, 6, 61/8, 61/4,	1,000-5,000	200-60	SNW
	SL12	126W	61/8	1,000-5,000	200-60	SNW
	HP12	126	77/8, 81/2, 83/4,	1,000-5,000	200-60	SW
	Y13	131	22, 26	1,000-5,000	250-60	S
	EMS13GC	135M	16, 17, 171/2	1,000-3,500	350-60	CGMN
	EMS13CDH	135M	16, 171/2	1,000-3,500	350-60	MN
	ETS13G	135M	115/8	500-3,500	800-120	SN
	ETS13GC	135M	115/8	500-3,500	800-120	SN
	MS13GC	135M	151/2	1,000-3,500	350-60	CGMN
	HP13	136	12	1,000-5,000	200-60	S
	HP13G	137	77/8, 81/2, 83/4,	1,000-5,000	200-60	SG
	MHT13G	137M	83/8, 81/2, 121/4	1,000-5,000	300-60	MG
	MHT13DH	137M	121/4	1,000-5,000	300-60	MGW
Security DBS	XN1	111	131/2, 143/4, 16,	1,000-4,000	80-200	
	XT1	115	131/2, 143/4, 16,	1,000-4,000	80-200	G
	XS1	117	43/4, 57/8, 6, 61/8,	1,000-4,000	80-200	
	XS1	117	61/2, 63/4, 77/8,	1,000-4,000	80-200	
	XSC1	117	43/4, 57/8, 6, 61/8,	1,000-4,000	80-200	W
	XSC1	117	61/2, 63/4, 77/8,	1,000-4,000	80-200	W
	XLC1	117	97/8, 105/8, 121/4	1,000-4,000	80-200	W
Smith	DSJ	111	121/4-28	1,000-4,000	70-180	
	SDS	114	81/2-171/2	1,000-4,000	80-200	
	MSDSH	115	121/4-26	1,000-4,000	50-280	HM
	MSDSHOD	115	121/4-26	1,000-4,000	50-280	HMW
	MSDSSH	115	121/4-26	1,000-4,000	50-280	HM
	MSDSSHOD	115	121/4-26	1,000-4,000	50-280	HMW
	MGSSH+	115	16-17 1/2	1,000-4,000	50-280	HMW
	XR+	117	6-63/4	1,000-5,000	50-300	HM
	FDS	116	77/8-121/4	1,500-6,000	50-160	
	FDS+	116	6-121/4	1,500-6,000	50-160	

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Steel Tooth Roller Cone Bits						
Smith	FGS+	117	9 7/8-21/4	1,500-6,000	50-160	W
	FDS+2	116	77/8-97/8	1,500-6,000	50-160	
	FGS+2	117	9 7/8-12 1/4	1,500-6,000	50-160	W
	FDSS+	116	77/8-121/4	1,500-6,000	50-160	
	FGSS+	117	9 7/8-12 1/4	1,500-6,000	50-160	W
	FDSS+2	116	81/2-121/4	1,500-6,000	50-160	
	FGSS+2	117	9 7/8-12 1/4	1,500-6,000	50-160	W
	MFDSH	117	43/4-121/4	1,000-5,000	50-250	HM
	MFDSHOD	117	77/8-121/4	1,000-5,000	50-250	HMW
	MFDSSH	117	81/2-121/4	1,000-5,000	50-250	HM
	FGSSH+	117	12 1/4	1,500-6,000	50-160	W
	FGSSH+OD	117	12 1/4	1,500-6,000	50-160	W
	DTJ	121	61/4-22	1,000-5,000	80-200	
	FDT	126	43/4-121/4	1,500-6,000	50-160	
	DGJ	131	121/4-28	1,000-4,000	70-180	
	MSDGH	135	12-223/4	1,000-5,000	50-280	HM
	MSDGHOD	135	121/4-28	1,000-5,000	50-280	HMW
	MGGH+	135	12 1/4-17 1/2	1,000-5,000	50-280	HMW
	SDGH	135	83/8-20	1,000-5,000	50-160	
	FDG	136	57/8-6	2,000-5,000	50-160	
	FDGH	137	77/8-121/4	2,000-5,000	50-160	
	MFDGH	137	83/8-81/2	1,000-5,000	50-250	HM
	MFDGHOD	137	83/8-81/2	1,000-5,000	50-250	HMW
TIX	SS	111	6, 61/4, 77/8	1,000-4,000	60-150	
	SS	111	83/8, 81/2, 85/8,	1,000-4,500	80-200	
	SS	111	97/8, 11, 115/8,	1,000-4,500	80-200	
	SS	111	133/4, 143/4, 15,	1,000-3,500	80-200	
	SS	111	20, 22, 23, 24, 26	1,000-3,500	80-200	
	SS-X	116	57/8, 61/4, 75/8,	1,500-4,000	60-120	B
	SS-X	116	81/2, 83/4, 97/8,	1,500-4,500	60-120	B
	SS-X	116	151/2, 171/2	1,500-3,500	60-120	B
	SS-Z	114	83/8, 81/2, 83/4,	1,500-4,500	80-150	
	SS-Z	114	121/4	1,500-4,500	80-150	
	SS-Z	114	133/4, 143/4, 15,	1,500-3,500	80-150	
	SS-XZ	114	121/4	1,500-4,500	80-150	
	SS-XZC	114	16, 171/2	1,500-3,500	80-150	C
	SS-MZC	114	16, 171/2	1,500-3,500	80-250	C
	S	121	57/8, 6, 61/4, 75/8,	1,000-4,000	60-150	
	S	121	83/8, 81/2, 85/8,	1,000-4,500	80-180	
	S	121	105/8, 11, 115/8,	1,000-4,500	80-180	
	S	121	133/4, 143/4, 15,	1,000-3,500	80-180	
	S	121	22, 23, 24, 26	1,000-3,500	80-180	
	S-X	126	57/8, 6, 61/4, 75/8,	1,500-4,000	60-120	B
	S-X	126	83/8, 81/2, 83/4,	2,000-4,500	60-120	B
	S-X	126	115/8, 121/4	2,000-4,500	60-120	B
	S-X	126	151/2, 171/2, 16	1,500-4,000	60-120	B
	S-TX	127	81/2, 121/4	2,000-4,500	60-120	BG
	S-TX	127	16, 171/2	1,500-4,000	60-120	BG
	S-Z	124	81/2, 83/4, 95/8,	1,500-4,500	80-150	
	S-Z	124	115/8, 121/4	1,500-4,500	80-150	
	S-Z	124	15, 171/2, 26	1,500-3,500	80-150	
	S-XZ	124	121/4	1,500-4,500	80-150	
	S-XZC	124	16, 171/2	1,500-3,500	80-150	C
	S-MZC	124	16, 171/2	1,500-3,500	80-250	CM

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Steel Tooth Roller Cone Bits						
Tri-Max	TM111	111	81/2-171/2	1,000-3,000	100-200	G
	TM114	114	81/2-171/2	2,000-3,000	100-200	GB
	TM115	115	6-171/2	2,000-3,000	80-150	GB
	TM116	116	6-171/2	2,000-4,000	80-150	GB
	TM117	117	6-171/2	2,000-4,000	80-150	GB
Varel	L3A	111S	81/2-36	1,500-4,500	250-80	S
	L111	111S	81/2-26	1,500-4,500	250-80	S
	L113	113S	26, 28	1,500-4,500	250-80	S
	L114	114S	121/4	1,500-4,500	200-80	S
	ETR1G	115S	121/4, 143/4, 16,	1,500-4,500	250-80	GW
	L116	116S	105/8	1,500-5,000	180-80	S
	L117	117S	77/8, 81/2, 83/4,	1,500-5,000	180-80	G
	L117GT	117S	121/4	1,500-5,000	180-80	G
	ETD1G	117S	77/8, 81/2, 83/4,	1,500-5,000	180-80	GW
	L3S	121S	51/8-15	2,000-5,000	250-80	S
	L121	121S	81/2, 121/4, 171/2	2,000-5,000	250-80	S
	L124	124S	81/2-24	2,000-5,000	200-80	S
	L125	125S	81/2, 171/2	2,000-5,000	200-80	G
	L126	126S	61/8-121/4	2,000-6,000	160-70	S
	L127	127S	61/8-121/4	2,000-6,000	160-70	G
	L127GT	127S	75/8	2,000-6,000	160-70	GM
	L131	131S	81/2-26	2,500-6,000	250-80	S
	L134	134S	121/4	2,500-6,000	160-60	S
	L135	135S	81/2, 83/4, 12,	2,500-6,000	160-60	G
	ETR3G	135S	115/8, 16, 171/2	2,000-6,000	180-80	GW
	L136	136S	83/8-171/2	2,500-6,000	140-60	S
	L137	137S	71/2-121/4	2,500-6,000	140-60	G
PDC Drill Bits						
BBL Brit Bit	BB542X	121	121/4	2500	Upto400	GKMQUIV
	BB452X	O614	81/2	2900	Any	KMQUmV
Bit-Tech	DP-440-B1	M131	61/4	300-2000	100-500	ADGMVW
Crystal	S45	M121	77/8, 83/8, 81/2,	400-2,000	80-250	GIMUI
	S45	M121	53/4, 57/8, 6, 61/8,	400-2,000	80-250	GIMUI
	S65	M221	81/2, 83/4, 97/8,	400-2,000	80-250	GIMUI
	S65	M221	53/4, 57/8, 6, 61/8,	400-2,000	80-250	GIMUI
	S65 I	M221	83/4, 91/2, 97/8,	400-2,000	80-250	GIMUI
	S65 I	M221	53/4, 57/8, 6, 61/8,	400-2,000	80-250	GIMUI
	LD245	M121	81/2, 83/4, 91/2,	400-2,000	80-250	GIMUI
	LD245	M121	53/4, 57/8, 6, 61/8,	400-2,000	80-250	GIMUI
DPI	SC45	S333	33/4, 41/8, 41/2,	200-3,500	60-450	DHKMV
	MC43	M233	53/4, 61/2, 77/8,	200-3,000	60-450	DHKMV
	MC45	M233	55/8, 57/8, 6, 61/8,	200-3,500	60-450	DHKMV
	MC45	M233	77/8, 81/2, 83/4,	200-3,500	60-450	DHKMV
	MP63	M223	121/4			
	MP64	M223	121/4			
	SC63	S123	97/8, 121/4, 141/2,	250-3,500	60-450	DHKMV
	SC65	S223	77/8, 81/2, 97/8,	250-3,500	60-450	DHKMV
	MC63	M123	97/8, 105/8, 121/4	250-3,000	60-450	DHKMV
	MT32	M142	121/4	250-3,000	60-450	DHKMV
	SC43	S133	97/8-121/4	250-3,000	60-450	DHKMV
	SC44	S233	81/2-121/4	250-3,500	60450	DHKMV
	SC61	S122	171/2	250-3,000	60-450	DHKMV
	SR(F)166 Bi-Center		121/4 X 131/2, 171/2, 143/4 X	250-3,000	60-200	DGHKMV
	SR(F)244 Bi-Center		81/2 x 97/8, 105/8	250-3,000	60-200	DGHKMV
	SR(F)266 Bi-Center		81/2 x 97/8, 97/8 x 105/8 x 121/4,	250-3,000	60-240	DGHKMV

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
DPI	CSD144 Bi-Center		121/4 X 143/4,			DGHKMV
	CSD066 Bi-Center		141/2 X 171/2			DGHKMV
	CSD166 Bi-Center		121/4 X 143/4, 17			DGHKMV
	SR(F)266 Bi-Center		105/8 X 121/4	250-3,000	60-200	DGHKMV
GeoDiamond	BC75 Bi-Center	S223	8-1/2x9-7/8-14-	400-2,000	60-600	GMNUmVW
	BC81 Bi-Center	S243	6x7	400-2,000	60-600	GMNUmVW
	BC91 Bi-Center	S223	12-1/4x12-3/4-17-	400-2,000	60-600	GMNUmVW
	BM73 Bi-Center	M223	121/4x133/4-	400-2,000	60-600	GMNUmVW
	M58	M131	33/4-81/2	400-2,000	60-600	GMNUmVW
	M81	M121	81/2	400-2,000	60-600	GMNUmVW
	M90	M223	81/2-121/4	400-2,000	60-600	GMNUmVW
	M91	M223	77/8-121/4	400-2,000	60-600	GMNUmVW
	M92	M123	81/2-121/4	400-2,000	60-600	GMNUlVW
	M94	M121	81/2-121/4	400-2,000	60-600	GMNUlVW
	M96	M121	97/8	400-2,000	60-600	GMNUlVW
	M97	M121	6-61/4	400-2,000	60-600	GMNUmVW
	MA74	M223	61/8-121/4	400-2,000	60-600	GMNUmVW
	MA82	M223	16-171/2	400-2,000	60-600	GMNUmVW
	MA89	M223	83/8-171/2	400-2,000	60-600	GMNUmVW
	MA99	M223	81/2-121/4	400-2,000	60-600	GMNUmVW
	S58	S131	33/4	400-2,000	60-600	GMNUlVW
	S75	S222	6-143/4	400-2,000	60-600	GMNUmVW
	S80	S123	43/4-121/4	400-2,000	60-600	GMNUlVW
	S81	S123	43/4	500-2,000	60-400	GMNUlVW
	S88	S222	81/2-171/2	400-2,000	60-600	GMNUmVW
	S90	S223	81/2	400-2,000	60-600	GMNUmVW
	S91	S123	81/2-20	400-2,000	60-600	GMNUmVW
	S94	S121	57/8-121/4	400-2,000	60-600	GMNUlVW
	S98	S111	61/8-81/2	400-2,000	60-600	GMNUlVW
	S99	S121	121/4	400-2,000	60-600	GMNUmVW
Hughes	ATX535	M123	57/8 - 171/2	235-2,500	60-350	GHVW
	TX554	M121	57/8 - 171/2	235-2,500	60-350	GHW
	ABD554	M121	77/8 - 171/2	235-2,500	60-350	MVW
	BD554	M121	57/8 - 171/2	235-2,500	60-350	GW
	BX554	M121	57/8 - 171/2	235-2,500	60-350	GMW
	STR443	M131	31/8 - 63/4	300-2,000	100-550	W
	STR444	M131	31/8 - 63/4	300-2,000	100-550	W
	STR535	M123	6-63/4	300-2,000	100-550	W
	STX403	M131	31/8 - 63/4	300-2,000	100-550	W
	STX404	M133	31/8 - 63/4	300-2,000	100-550	W
	STX603	M123	6 - 63/4	300-2,000	100-550	W
	STX604	M121	6 - 63/4	300-2,000	100-550	W
	G573	M121	81/2-171/2	235-2,500	60-300	MWUl
	AG574	M121	81/2-171/2	235-2,500	60-500	MVWUm
	AG554	M121	81/2-121/4	235-3,000	60-240	MVW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
Hycalog	DS38	S133	311/16-43/4	300-3,000	Variable	GHMUIV
	DS39H	M231	57/8-121/4	300-3,000	Variable	GHMWUIV
	DS40H	S121	6-181/2	300-3,000	Variable	GHMWUIV
	DS53H	S231	77/8-131/2	300-3,000	Variable	GHMWUIV
	DS61H	S221	77/8-26	300-3,000	Variable	GHMWUIV
	DS68	S423	57/8-121/4	300-3,000	Variable	GHMUIV
	DS90	S323	6-81/2	300-3,000	Variable	GHMWUIV
	DS100H	S132	25/8 x 215/16-	300-3,000	Variable	GHMWUIV
	DS104H	M223	61/4-171/2	300-3,000	Variable	GHMWUIV
	DS105H	S222	61/8-16	300-3,000	Variable	GHMWUIV
	DS105D	S222	57/8-81/2	300-3,000	Variable	GHMWUIV
	DS117	M221	121/4	300-3,000	Variable	GHMWUIV
	DS149	M132	61/4	300-3,000	Variable	GHMWUIV
	DS172D	M123	61/8	300-3,000	Variable	GHMWUIV
	DS174	S123	43/4	300-3,000	Variable	GHMWUIV
	DS185	M123	63/4	300-3,000	Variable	GHMWUIV
Kingdream	B364	M131	61/2,81/2,97/8,121	500-2,500	100-600	
RockBit	KDM33FT	S121	77/8-121/4	500-3,000	80-450	MG
	KD3419	S213	6,61/8,61/4,77/8,8	500-2500	60-450	GHMVW
	KD3519	S223	6,61/8,61/4,77/8,8	500-2500	60-450	GHMVW
	KDS11	S233	77/8-171/2	250-2,500	100-500	M
Security DBS	FM2446	M131	121/4	500-2,000	60-400	MVW
	FM2466	M111	121/4	500-2,000	60-400	MVW
	FM2643	M331	57/8, 6, 61/8, 61/4,	500-2,000	60-400	MVW
	FM2862	M121	143/4, 171/2	500-2,000	60-400	MVW
	FM2365	M421	81/2	350-2,000	60-400	MVW
	FM2563	M121	181/2	500-2,000	60-400	MVW
	FM2648	M231	12, 121/4	500-2,000	60-400	MVW
	FM2566	M323	121/4	500-2,000	60-400	MVW
	B10-25	M434	81/2, 97/8	500-2,000	250-1400	MN
	FM2565	M223	77/8, 97/8, 83/4,	500-2,000	60-400	MVW
	FM2465	M323	6, 61/4, 81/2, 97/8,	200-3,500	60-400	MVW
	FM2565	M423	77/8, 83/8, 81/2,	500-2,000	60-400	MVW
	FM2365	M224	97/8	350-2,000	60-400	MVW
	FM2365	M124	121/4	350-2,000	60-400	MVW
	FM2662	M122	171/2	500-2,000	60-400	MVW
	FM2664	M423	83/4	500-2,000	60-400	MVW
	FM2545	M333	97/8	500-2,000	60-400	MVW
	FM2662	M323	121/4	500-2,000	60-400	MVW
	FS2441	S432	6, 61/8, 61/2, 63/4,	500-2,000	60-400	MVW
	FS2461	S322	81/2, 97/8, 121/4	500-2,000	60-400	MVW
	FS2463	S323	81/2, 97/8, 121/4,	500-2,000	60-400	MVW
	FS2465	S424	81/2	500-2,000	60-400	MVW
	FS2545	S334	81/2	500-2,000	60-400	MVW
	FS2565	S424	81/2, 97/8, 121/4	500-2,000	60-400	MVW
	FS2645	S434	81/2, 97/8	500-2,000	60-400	MVW
	FS2563	S323	97/8, 121/4, 141/2,	500-2,000	60-400	MVW
	FS2543	S133	121/4	500-2,000	60-400	MVW
	FS2663	S323	12, 121/4, 131/2,	500-2,000	60-400	MVW
	FS2467	S424	61/8	500-2,000	60-400	MVW
	FS2665	S124	20, 22	500-2,000	60-200	MVW
	FS2661	S122	26	500-2,000	60-200	MVW
	FS2641	S132	24	500-2,000	60-200	MVW
	SE3442	M432	6, 61/8	200-2,000	60-400	DVW
	SE3461	M422	6-121/4	200-3,000	60-400	DVW
	SE3321A	S442	33/4	200-1,000	60-400	DVW
	SE3463A	S433	121/4	500-2,000	60-400	DVW
	SE3641A	S433	81/2	500-2,000	60-400	DVW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
Tri-Max	S-1	S315	6-171/2	1,000-3,000	80-200	DGM
	S-1S	S315	6-171/2	1,000-2,000	80-200	DGM
	Q-2	S644	81/2-171/2	1,000-2,000	80-200	DGM
Varel	447	M123	63/4-83/4	500-2,000	60-400	GMW
	467	M223	97/8-121/4	500-2,000	60-400	GMW
	507	M323	121/4-143/4	500-2,000	60-400	GMW
	587	M323	81/2-121/4	500-2,000	60-400	GMW
	577	M323	81/2-121/4	500-2,000	60-400	GMW
	557	M323	77/8-121/4	500-2,000	60-400	GMW
	445	M233	57/8-83/4	500-2,000	60-400	GMW
	LD245	M121	81/2, 83/4, 91/2,	400-2,000	80-250	GIMUI
	LD245	M121	53/4, 57/8, 6, 61/8,	400-2,000	80-250	GIMUI
	S250	M223	83/8, 81/2, 83/4,	400-2,000	80-250	GIMUm
	SKS76	S111	16, 171/2	100-2,000	60-120	
Insert Roller Cone Bits						
Hughes	MX-00	417	81/2, 171/4	1,000-6,000	220-50	BGMW
	MX-03	417	81/2, 83/4, 121/4,	1,000-6,000	220-50	BGMW
	MX-09	437	77/8, 81/2, 97/8,	1,000-6,000	220-50	BGMW
	MX-09C	427	81/2	1,000-6,000	220-50	BGMW
	MX-09CG	447	12 1/4	1,000-6,000	250-50	BGMW
	MX-09G	437	81/2	1,000-6,000	220-50	BGMW
	MX-09H	437	121/2, 171/2	1,000-6,000	220-50	BGMW
	MX-18	447	77/8, 83/8, 81/2,	1,000-6,000	220-50	BGMW
	MX-18G	447	8 1/2	1,000-6,000	300-50	BGMW
	HX-05C	427	7 7/8	1,000-6,000	220-50	EGW
	H-03	417	77/8, 81/2, 83/4,	1,000-6,000	220-50	EGW
	H-05CB	415	77/8, 83/4	1,000-6,000	220-50	EGW
	H-09C	427	77/8, 83/4	1,000-6,000	220-50	EGW
	H-09	437	77/8, 81/2, 83/4,	1,000-6,000	220-50	EGW
	H-18	447	77/8, 83/4	1,000-6,000	220-50	EGW
	H-18C	447	77/8	1,000-6,000	220-50	EGW
	H-18H	447	12 1/4	1,000-6,000	220-50	EGW
	STX-09	437	57/8, 6, 61/8	2,000-5,000	250-80	GHW
	STX-18	447	6 1/8	2,000-5,000	250-80	GHW
	STR-03	417	61/8	2,000-5,000	250-80	GHW
	STR-05C	427	4 3/4	2,000-5,000	250-80	GHW
	STR-09	437	61/4 , 61/2, 63/4	2,000-5,000	250-80	GHW
	STR-09C	427	6, 61/8, 61/4	2,000-5,000	250-80	GHW
	STR-18	447	3 7/8	2,000-5,000	250-80	GHW
	MAXGT-09	435	141/2, 143/4	1,000-3,500	350-80	BGW
	GT-00	417	83/4, 121/4			W
	GT-03	417	77/8, 81/2, 83/4,	2,000-5,000	140-70	W
	GT-09	437	77/8, 81/2, 83/4,	2,000-5,000	140-70	W
	GT-09C	427	77/8, 83/4, 121/4	2,000-5,000	140-60	WY
	GTX-00	415	24, 26	1,000-3,500	200-80	W
	GTX-03	415	16, 171/2, 22, 23,	1,000-3,500	200-80	W
	GTX-03C	415	30	1,000-3,500	200-80	W
	GTX-03H	415	17 1/2	1,000-3,500	200-80	W
	GTX-09	435	16, 171/2, 20, 22,	1,000-3,500	200-80	W
	GTX-09H	435	16	1,000-3,500	200-80	W
	GTX-11	435	22	1,000-3,500	200-80	W
	GTX-11H	435	171/2, 20	1,000-3,500	200-80	W
	MAXGT-18	445	14 3/4	1,500-4,500	300-80	BGW
	GT-18	447	77/8, 81/2, 83/4,	2,000-6,000	120-50	W
	GT-18C	447	77/8	2,000-6,000	120-50	WY

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
Industrial	SKGJ	517	71/2, 83/8, 81/2,	3,500-5,000	40-80	
	GA435	435	81/2	1,000-4,000	200-80	CEGL
	GAT435	435	171/2	1,000-4,000	200-80	CEGL
	GJ415	415	171/2	1,000-3,000	350-80	CEGL
	GJT415	415	171/2	1,000-3,000	350-80	CEGL
	GJ435	435	171/2	1,000-4,000	350-80	CEGL
	GJT435	435	171/2	1,000-4,000	350-80	CEGL
	HA417	417	81/2,91/2	2,000-5,000	140-70	CEGL
	H437	437	81/2,91/2,121/4	2,500-4,000	150-60	CEGL
	HT437	437	81/2	2,500-4,000	150-60	CEGL
	HD437	437	81/2	2,500-4,000	150-60	CEGL
	HA437	437	57/8,6,61/2,77/8,8	2,000-5,000	140-60	CEGL
	HAT437	437	121/4	2,000-5,000	140-60	CEGL
	HAD437	437	121/4	2,000-5,000	140-60	CEGL
	H447	447	81/2	2,500-4,000	150-60	CEGL
	HA447	447	81/2	2,000-6,000	140-60	CEGL
	HAT447	447	121/4	2,000-6,000	120-60	CEGL
	FA447	447	81/2	2,000-5,000	250-60	CEGL
	HJ447	447	81/2	2,000-6,000	240-60	CEGL
	HJT447	447	81/2	2,000-6,000	240-60	CEGL
	HF447	447	81/2	2,000-5,000	250-60	CEGL
	HFT447	447	81/2	2,000-5,000	250-60	CEGL
New Tech	NT01	417X	77/8, 83/4	1,500-4,000	60-180	CGLM
	NT05C	427Y	77/8	1,500-4,000	60-140	CEGL
	NT09C	427Y	77/8	1,500-4,000	60-180	CGLM
	NT12X	437X	77/8	1,500-4,000	60-110	CGLM
	C1	427X	43/4, 57/8, 6, 61/8,	1,500-4,000	350-60	ACEGHLMT
RBI/Gearhart	C1	427X	63/4, 77/8, 81/2,-	1,500-4,000	350-60	ACEGHLMT
	C1	425X	16	1,500-4,000	350-60	ACEGHLMT
	C1LRGSP	427X	43/4, 57/8, 6, 61/8,	1,500-4,000	350-60	ACEGHMT
	C1LRGSP	427X	63/4, 77/8, 81/2,	1,500-4,000	350-60	ACEGHMT
	C1LRGSP	425X	16	1,500-4,000	350-60	ACEGHMT
	C05	417X	77/8, 81/2, 83/4,	1,500-4,000	350-60	ACEGHLMT
	C1VLRGSP	427X	43/4, 57/8, 6, 61/8,	1,500-4,000	350-60	ACEGHMT
	C1VLRGSP	427X	77/8, 81/2, 83/4,	1,500-4,000	350-60	ACEGHMT
	C1VLRGSP	425X	16	1,500-4,000	350-60	ACEGHMT
	C05	415X	171/2	1,500-4,000	350-60	ACEGHLMT
	C05LRGSP	417X	43/4, 57/8, 6, 61/8,	1,500-4,000	350-60	ACEGHMT
	C05LRGSP	417X	63/4, 77/8, 81/2,	1,500-4,000	350-60	ACEGHMT
	C05LRGSP	415X	171/2	1,500-4,000	350-60	ACEGHMT
	C05VLRGSP	417X	43/4, 57/8, 6, 61/8,	1,500-4,000	350-60	ACEGHMT
	C05VLRGSP	417X	63/4, 77/8, 81/2,	1,500-4,000	350-60	ACEGHMT
	C05VLRGSP	415X	171/2	1,500-4,000	350-60	ACEGHMT
	C15	437X	43/4, 57/8, 6, 61/8,	2,000-5,000	350-60	ACEGHLMT
	C15	437X	63/4, 77/8, 81/2,	2,000-5,000	350-60	ACEGHLMT
	C15	435X	143/4, 16, 171/2	2,000-5,000	350-60	ACEGHLMT
	C15LRG	437X	43/4, 57/8, 6, 61/8,	2,000-5,000	350-60	ACEGHMT
	C15LRG	437X	63/4, 77/8, 81/2,	2,000-5,000	350-60	ACEGHMT
	C15LRGSP	435X	143/4, 16, 171/2	2,000-5,000	350-60	ACEGHMT
	C15LRGSP	437X	43/4, 57/8, 6, 61/8,	2,000-5,000	350-60	ACEGHMT
	C15LRGSP	437X	63/4, 77/8, 81/2,	2,000-5,000	350-60	ACEGHMT
	C15VLRGSP	435X	143/4, 16, 171/2	2,000-5,000	350-60	ACEGHMT
	B15LRGSP	437X	37/8, 41/8, 41/2,	2,000-5,000	350-60	AGHLM
	B15LRGSP	437X	57/8, 6, 61/8, 61/4,	2,000-5,000	350-60	AGHLM
	C17	447Y	43/4, 57/8, 6, 61/8,	2,000-5,000	350-60	ACEGHLMT
	C17	447Y	63/4, 77/8, 81/2,	2,000-5,000	350-60	ACEGHLMT
	C17H	447Y	77/8	2,000-5,000	350-60	CGHM
	C17LRGSP	447Y	57/8, 6, 61/8, 61/4,	2,000-5,000	350-60	ACEGHMT
	C18	447X	77/8, 81/2, 83/4,	2,000-5,000	350-60	ACEGHLMT
	C18LRGSP	447X	77/8, 81/2, 83/4,	2,000-5,000	350-60	ACEGHMT
	C18	445X	16	2,000-5,000	350-60	ACEGHLMT
	C18LRGSP	445X	16	2,000-5,000	350-60	ACEGHMT

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
Reed	EMS41HC	415M	16, 171/2	2,000-5,000	450-60	CGMNY
	EMS41HCDH	415M	16, 171/2	2,000-5,000	450-60	GY
	EHP41	417	81/2	2,000-5,000	200-60	Y
	EHP41A	417	81/2	2,000-5,000	200-60	X
	EHP41ADH	417W	81/2	2,000-5,000	200-60	GWX
	EHP41H	417	121/4	2,000-5,000	200-60	X
	HP41H	417	77/8, 8 3/4	2,000-5,000	200-60	G
	HP41A	417	81/2	2,000-5,000	200-60	X
	EHP42H	427	121/4	2,000-5,000	200-60	X
	EMS43H	427	12 1/4	2,000-5,000	200-60	CGMNY
	EMS43HDH	427	12 1/4	2,000-5,000	200-60	CGMNY
	EMS43AC	435M	171/2	1,500-4,000	350-60	GMNX
	EMS43HC	435M	16, 22	1,500-4,000	350-60	GMNX
	EMS43HCDH	435M	16, 22	1,500-4,000	350-60	GMNXW
	EMS43HCDHT	437	22, 26	2,000-5,000	350-60	X
	EHP43	437	81/2, 83/4	2,000-5,000	200-60	Y
	EHP43A	437	81/2, 83/4, 97/8	2,000-5,000	200-60	X
	EHP43AF	437W	81/2	2,000-5,000	200-60	GW
	EHP43ADH	437W	81/2, 9 7/8	2,000-5,000	200-60	GW
	EHP43AFDH	437W	81/2	2,000-5,000	200-60	GW
	EHP43H	437	6, 61/8, 6 1/4, 10	2,000-5,000	200-60	G
	SL43H	437	6	2,000-5,000	200-60	G
	EHP43HDH	437W	121/4	2,000-5,000	200-60	G
	EHP43HFDH	437W	121/4	2,000-5,000	200-60	GW
	HP43	437	7 7/8, 8 1/2, 8 3/4,	2,000-5,000	180-60	Y
	HP43-M	437	77/8	2,000-5,000	180-60	Y
	HP43A	437	77/8, 81/2, 83/4,	2,000-5,000	180-60	X
	HP43A-M	437	77/8	2,000-5,000	180-60	X
	HP43AFDG	437	77/8	2,000-5,000	180-60	X
	EMS44AC	445M	17	2,000-4,500	350-60	CGMNX
	EMS44ACDH	445M	17	2,000-4,500	350-60	CGMNX
	EMS44ACDH	445M	16, 17 1/2	2,000-4,500	350-60	CGMNX
	EMS44H	445M	12 1/4	2,000-4,500	200-60	CGMNX
	EMS44HDH	445M	12 1/4	2,000-4,500	200-60	CGMNX
	EMS44HC	445M	15 1/2, 16, 171/2	2,000-4,500	350-60	CGMNX
	EMS44HCDH	445M	16, 171/2	2,000-4,500	350-60	CGMNX
	HP44-M	447	77/8	1,500-4,500	180-60	Y
	HP44	447	77/8, 8 3/4	1,500-5,500	200-60	Y
	HP44H	447	77/8	1,500-5,500	200-60	X
	HP44X	447	77/8	1,500-5,500	200-60	X
	HP44X-M	447	77/8	1,500-4,500	180-60	Y
	EHP44	447	83/4	1,500-5,500	200-60	X
	EHP44H	447	81/2, 8 3/4, 121/4	1,500-5,500	200-60	X
	EHP44HDH	447W	81/2, 121/4	1,500-5,500	200-60	WX
	EHP44HDGH	447W	121/4	1,500-5,500	200-60	WX
	EHP44HFDH	447W	81/2, 121/4	1,500-5,500	200-60	WX
Security DBS	XT00 - XT05	415	131/2, 143/4, 16,	1,000-4,000	80-250	B
	XS00 - XS05	417	43/4, 57/8, 6, 61/8, 81/2, 83/4, 97/8,	1,000-4,000	80-250	B
	XL00 - XL05	417	97/8, 105/8, 121/4	1,000-4,000	80-250	BC
	XT06 - XT09	425	131/2, 143/4, 16,	1,000-4,000	80-250	B
	XS06 - XS09	427	43/4, 57/8, 6, 61/8, 81/2, 83/4, 97/8,	1,000-4,000	80-250	B
	XL06 - XL09	427	97/8, 105/8, 121/4	1,000-4,000	80-250	BC
	XT(D)10 - XT(D)13	435	131/2, 143/4, 16, 26, 28	1,000-4,000	80-250	BW
	XS(D)10	437	43/4, 57/8, 6, 61/8,	1,000-4,000	80-250	BW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
Security DBS	- XS(D)13 XL(D)10 - XL(D)13	437	81/2, 83/4, 97/8, 97/8, 105/8, 121/4	1,000-4,000	80-250	BWC
	XT(D)14 - XT(D)17	445	131/2, 143/4, 16, 26, 28	1,000-4,000	80-250	BW
	XS(D)14 - XS(D)17	447	43/4, 57/8, 6, 61/8, 81/2, 83/4, 97/8,	1,000-4,000	80-250	BW
	XL(D)14 - XL(D)17	447	97/8, 105/8, 121/4	1,000-4,000	80-250	BWC
Smith	02GM	415X	121/4-171/2	1,000-4,000	50-280	XHMGW
	M02S	415X	121/4-26	1,000-4,000	50-280	XHM
	M02SOD	415X	121/4-26	1,000-4,000	50-280	XHMW
	MG02Q	415X	121/4-171/2	1,000-4,000	50-280	XHMG
	02MF	417X	121/4	1,000-4,000	50-250	XHMGW
	F02T	417X	121/4	1,000-4,000	50-160	X
	05GM	425X	121/4-171/2	1,000-4,000	50-280	XHMGW
	05GMD	425X	121/4-171/2	1,000-4,000	50-280	XHMGW
	MG05Q	425X	16-17 1/2	1,000-4,000	50-280	XHMG
	M05SOD	425X	121/4	1,000-4,000	50-280	XHMW
	05MF	427X	81/2-121/4	1,000-5,000	50-250	XHMGW
	05MFD	427X	81/2-121/4	1,000-5,000	50-250	XHMGW
	F05	427X	77/8	1,000-5,500	50-160	X
	F05T	427X	83/4	1,000-5,500	50-160	X
	MF05	427X	81/2	1,000-5,000	50-250	XHM
	MF05OD	427X	81/2	1,000-5,000	50-250	XHMW
	MF05T	427X	81/2-83/4	1,000-5,000	50-250	XHM
	F07	427Y	77/8-83/4	1,000-6,000	50-160	Y
	MF07DD	427Y	6	1,000-5,000	50-250	YHMW
	MG08	425X	22	1,000-5,000	50-280	XHMG
	10GM	435X	121/4-171/2	1,000-4,000	50-280	XHMGW
	10GMD	435X	121/4-171/2	1,000-4,000	50-280	XHMGW
	12M	435X	121/4-171/2	1,000-4,500	50-280	XHMGW
	12MD	435X	121/4-171/2	1,000-4,500	50-280	XHMGW
	MG10TQ	435X	16	1,000-5,000	50-280	XHMG
	M12T	435X	121/4	1,000-5,000	50-280	XHM
	MG12	435X	22	1,000-5,000	50-280	XHM
	M1S	435X	121/4-24	1,000-4,000	50-280	XHM
	M1SOD	435X	121/4-24	1,000-4,000	50-280	XHMW
	12MY	435Y	121/4-171/2	1,000-5,000	50-280	YHMGW
	M12TY	435Y	121/4	1,000-5,000	50-280	YHM
	10MF	437X	81/2-121/4	1,000-5,000	50-250	XHMGW
	10MFD	437X	91/2-121/4	1,000-5,000	50-250	XHMGW
	12MF	437X	91/2-121/4	1,000-5,000	50-250	XHMGW
	12MFD	437X	91/2-121/4	1,000-5,000	50-250	XHMGW
	XR10T	437X	6-63/4	1,000-5,000	50-300	XHM
	F1	437X	77/8-121/4	2,000-5,000	50-160	X
	F10T	437X	77/8-121/4	2,000-5,000	50-160	X
	F12T	437X	77/8-121/4	2,000-5,000	50-160	X
	F12Y	437Y	77/8	2,000-5,000	50-160	Y
	F14T	437X	77/8-83/4	2,000-5,000	50-160	X
	F1OD	437X	77/8-121/4	2,000-5,000	50-160	XW
	MF1	437X	81/2-97/8	2,000-5,000	50-250	XHM
	MF10T	437X	81/2	2,000-5,500	50-250	XHM
	MF12	437X	6	1,000-5,000	50-250	XHM
	MF12OD	437X	6	1,000-5,000	50-250	XHMW
	MF1OD	437X	97/8	2,000-5,000	50-250	XHMW
	12MFY	437Y	97/8-121/4	1,000-5,000	50-250	YHMGW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
Smith	15GM	445X	121/4-171/2	1,000-5,000	50-280	XHMGW
	15GMD	445X	121/4-171/2	1,000-5,000	50-280	XHMGW
	M15S	445X	121/4-23	1,000-5,000	50-280	XHM
	M15SD	445X	121/4-171/2	1,000-5,000	50-280	XHMW
	M15SOD	445X	121/4-171/2	1,000-5,000	50-280	XHMW
	M15T	445X	121/4-22	1,000-5,000	50-280	XHM
	MA15	447T	31/2	1,000-2,500	80-280	XHMT
	15MF	447X	83/8-121/4	2,000-5,000	50-250	XHMGW
	15GFD	447X	12 1/4	2,000-5,000	50-250	XHMGW
	XR15T	447X	6-63/4	1,000-5,000	50-300	XHM
	XR15TDG	447X	6-63/4	1,000-5,000	50-300	XHMW
	F15	447X	6-121/4	2,000-5,000	50-160	X
	F15OD	447X	63/4-81/2	2,000-5,000	50-160	XW
	FG15Q	447X	12 1/4	2,000-5,000	50-160	XG
	MF15	447X	37/8-115/8	2,000-5,000	50-250	XHM
	MF15D	447X	81/2-97/8	2,000-5,000	50-250	XHMW
	MF15OD	447X	57/8-97/8	2,000-5,000	50-250	XHMW
	MF15T	447X	81/2-105/8	2,000-5,000	50-250	XHM
	MF15H	447X	5 7/8-7 7/8	2,000-5,000	50-250	XHM
	MG18Q	445X	16-17 1/2	2,000-5,000	50-280	XHMG
TIX	XZO5GPC	415X	171/2	1,000-3,500	80-150	CGX
	M1OGP	437X	81/2, 121/4	1,000-4,500	70-250	GLMX
	X10G	437X	81/2, 121/4	1,500-4,500	60-120	GX
	X10YG	437Y	81/2, 121/4	1,500-4,500	60-120	GY
	XZ10G	435X	121/4	1,000-4,000	80-150	GX
	XZ10GC	435X	16, 171/2	1,000-3,500	80-150	CGX
	MZ10GPC	435X	16, 171/2	1,000-3,500	80-250	CGLMX
	XZ15G	445X	121/4	1,000-4,500	80-150	GX
	XZ15GC	445X	16, 171/2	1,000-3,500	80-150	CGX
	X15G	447X	81/2, 121/4	1,500-5,000	60-120	GX
	M15GP	447X	81/2, 121/4	1,000-5,000	60-250	GLMX
	MZ15GPC	445X	16, 171/2	1,000-3,500	80-250	CGLMX
Varel	ETR04	415X	121/4, 16, 171/2	1,500-3,500	275-80	W
	ETD04	417X	81/2, 121/4	1,500-3,500	180-60	W
	ETD12	437X	77/8	2,000-4,500	160-60	W
	ETR14	435X	121/4, 171/2	2,000-4,500	250-80	W
	V435	435X	171/2	2,000-4,500	200-80	W
	ETD14	437X	61/4-121/4	2,000-4,500	160-60	W
	ETD14E	437X	61/4, 77/8	2,000-4,500	160-60	W
	ETD15	447Y	77/8	2,000-4,500	160-60	W
	ETD15E	447Y	77/8	2,000-4,500	160-60	W
	ETR18	445X	121/4, 171/2	2,500-4,500	250-80	W
	ETD18	447X	77/8, 81/2, 121/4	2,500-4,500	160-60	W
Surface Set Diamond Coring Bits						
Bit-Tech	CN321BL	M613	61/8	300-2000	60-120	AGMR
Security DBS	CSD120	S134	6-121/4	250-3,500	50-150	F
	CT103UF	M423	81/2	250-3,500	50-150	F
PDC Coring Bits						
Baker Hughes-INTEQ	ARC412	M354	43/4-121/4	400-2,000	50-500	Low Inv VGMF
	ARC422	NA	81/2-121/4	850-1250	50-500	Low Inv VGMF
	RC412	M354	43/4-121/4	400-2,000	50-200	Low Inv F
	RC414	M355	43/4 x 121/4	400-2,350	80-500	Short MF
Bit-Tech	CP-440-BU	M342	6, 61/8	300-2000	50-500	AFGMVW
	CP-440-BU	M232	77/8, 81/2, 83/4	300-2000	50-500	AFGMVW
	CP-440E	M342	77/8, 81/2, 83/4	300-2000	60-120	AFG

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Coring Bits						
Crystal	C60	M232	57/8, 531/32, 6,	100-2,000	60-120	GUI
	C60	M232	83/8, 81/2, 83/4,	100-2,000	60-120	GUI
	C100	M232	57/8, 531/32, 6,	100-2,000	60-120	GUI
	C100	M232	83/8, 81/2, 83/4,	100-2,000	60-120	GUI
Kingdream	BC462	M334	43/4,6,81/2,121/4	500-2,500	80-500	
	BC460	M331	77/8,81/2,97/8	500-2,500	80-500	
RockBit	KDC675	S883	81/2-121/4	400-3,350	50-200	ILO
	KDC66	S884	43/4-121/4	400-3,350	40-150	ILO
	KDC6CH	S884	43/4-121/4	400-3,350	40-150	ILO
	KDC675	S883	81/2-121/4	400-3,350	50-200	ILO
	KDC66	S884	43/4-121/4	400-3,350	40-150	ILO
	KDC6CH	S884	43/4-121/4	400-3,350	40-150	ILO
Security DBS	CD 502	M132	6-121/4	250-3,500	50-150	
	CD 73	M233	6-121/4	250-3,500	50-150	F
	FC264	M233	6-121/4	250-3,500	50-150	F
	CSP 107	S234	6-121/4	250-3,500	50-150	F
	CS93	S132	4-81/2, 51/4-121/4	250-3,500	50-150	F
	FC244LI	M243	81/2-121/4	250-3,500	50-150	F
Varel	C60	M232	57/8, 531/32, 6,	100-2,000	60-120	GUI
	C60	M232	83/8, 81/2, 83/4,	100-2,000	60-120	GUI
	C100	M232	57/8, 531/32, 6,	100-2,000	60-120	GUI
	C100	M232	83/8, 81/2, 83/4,	100-2,000	60-120	GUI
	CS54	M132	81/2	100-2,000	60-120	GUI
	CS74	M122	81/2	100-2,000	60-120	GUI
Fish Tail Bits						
Bit-Tech	DP-440-B1E	M131	6 1/4	300-2000	100-500	ADGMVW
GeoDiamond	M94	M121	7 7/8-12 1/4	400-2,000	60-600	GMNUlVW
	M96	M121	9 7/8	400-2,000	60-600	GMNUlVW
	M97	M121	6-9 7/8	400-2,000	60-600	GMNUlVW
	S58	S131	3 3/4	400-2,000	60-600	GMNUlVW
	S75	S222	6-14 3/4	400-2,000	60-600	GMNUmVW
	S80	S123	4 3/4-1 2/4	400-2,000	60-600	GMNUlVW
	S81	S123	4 3/4	500-2,000	60-400	GMNUlVW
	S88	S222	8 1/2-17 1/2	400-2,000	60-600	GMNUmVW
	S90	S223	8 1/2	400-2,000	60-600	GMNUmVW
	S91	S123	81/2-20	400-2,000	60-600	GMNUmVW
	S94	S121	5 7/8-12 1/4	500-3,000	60-600	GMNUlVW
	S97	S122	6	500-3,000	60-600	GMNUlVW
	S98	S111	6 1/4-8 1/2	400-2,000	60-600	GMNUmVW
	S99	S121	12 1/4	400-2,000	60-600	GMNUmVW
RockBit	KDM33FT	S121	7 7/8,8 1/2,8	500-3,000	80-450	MG

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Soft-Medium						
PDC Drill Bits						
BBL Brit Bit	BB642X	223	83/8-121/4	3,000	Any	GKMQUmV
	BB452X	O614	81/2	2900	Any	KMQUmV
	BB852X	S616	16	2800	Any	KMQUmV
Bit-Tech	HP-440-B	M342	31/2, 35/8, 33/4,	200-3000	200-1000	ADFGHMNV
	HP-440-B	M342	41/2, 45/8, 43/4,	200-3000	200-1000	ADFGHMNV
	HP-440-B13	M232	6, 61/8, 61/4, 61/2,	200-3000	60-600	ADGHMVW
	DP-440-B2U	M232	77/8, 81/2, 83/4	400-3000	60-600	ADGMVW
Christensen Products	ChrisDril		13/4-12	Variable	100-275	AW
Crystal	S65 I	M221	53/4, 57/8, 6, 61/8,	400-2,000	80-250	GIMUI
	S65 I	M221	81/2, 83/4, 97/8,	400-2,000	80-250	GIMUI
	S250	M223	83/8, 81/2, 83/4,	400-2,000	80-250	GIMUm
	S66	M222	83/8, 8 1/2, 83/4,	400-2,000	80-500	GIMUm
	LD327	M232	53/4, 57/8, 6, 61/8,	400-2,000	80-250	GIMUI
	LD327	M232	81/2, 83/4, 97/8,	400-2,000	80-250	GIMUI
	S75	M422	171/2	400-2,000	80-250	GIMUm
	RD50	M323	83/8, 81/2, 83/4,	400-2,000	80-500	GIMUm
	S265	M424	83/8, 81/2, 83/4,	400-2,000	80-500	GIMUm
	RD90 H	M433	41/8, 53/4, 57/8, 6,	400-2,000	80-500	GIMUm
	RD90 H	M433	81/2, 83/4, 97/8,	400-2,000	80-500	GIMUm
	RD90 HY	M433	41/8, 53/4, 57/8, 6,	400-2,000	80-500	GIMUm
	RD90 HY	M433	81/2, 83/4, 97/8,	400-2,000	80-500	GIMUm
	LD548H	M424	83/8, 81/2, 83/4,	400-2,000	80-500	GIMUm
	S270	M322	53/4, 57/8, 6, 61/8,	400-2,000	80-500	GIMUm
	S270	M322	77/8, 83/8, 81/2,	400-2,000	80-500	GIMUm
	K100	M432	53/4, 57/8, 6, 61/8,	400-2,000	80-500	DGHMUh
	K100	M432	77/8, 83/8, 81/2,	400-2,000	80-500	DGHMUh
	S65 I	M221	53/4-171/2	400-2,000	80-250	GIMUI
DPI	SC45	S333	33/4, 41/8, 41/2,	200-3,500	60-450	DHKMV
	SC45	S333	61/8, 61/4, 61/2,	200-3,500	60-450	DHKMV
	MC43	M233	53/4, 61/2, 77/8,	200-3,000	60-450	DHKMV
	MC45	M233	55/8, 57/8, 6, 61/2,	200-3,500	60-450	DHKMV
	SC44	S233	121/4	250-3,500	60450	DHKMV
	SC46	S333	61/8-61/2	250-3,500	60450	DHKMV
	SC63	S123	97/8, 121/4, 141/2,	250-3,500	60-450	DHKMV
	SC65	S223	77/8, 81/2, 97/8,	250-3,500	60-450	DHKMV
	MC63	M123	97/8, 105/8, 121/4	250-3,000	60-450	DHKMV
	MT33	M142	6-121/4	250-3,500	60450	DHKMV
	MT63	M122	121/4	250-3,500	60450	DHKMV
	ST63	S122	121/4	250-3,500	60450	DHKMV
	MP34	M243	81/2, 91/2, 97/8,			
	MP35	M243	81/2			
	MP36	M343	81/2			
	MP44	M233	81/2, 83/4, 121/4			
	MP45	M233	81/2, 83/4, 121/4			
	MP65	M223	121/4			
	SP32	S143	171/2			
	ST64	S223	121/4	250-3,500	60450	DHKMV
	SR(F)166 Bi-Center		121/4 x 131/2, 141/2 x 171/2	250-3,000	60-200	DGHKMV
	SR(F)244 Bi-Center		81/2 x 97/8, 105/8	250-3,000	60-200	DGHKMV
	SR(F)266 Bi-Center		81/2 x 97/8,- 7/8 x 103/8 x 121/4,	250-3,000	60-240	DGHKMV
	SD64	S223	81/2			DGHKMV
	SD45	S233	97/8			DGHKMV
	SD63	S123	121/4			DGHKMV

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
DPI	CSD244 Bi-Center		81/2 X 97/8, 105/8			DGHKMV
	CSD133		61/2 x 71/2, 81/2 X 105/8 X 121/4			DGHKMV
	CSD033		121/4 x 133/4,			
	CSD044		17 x 20			
	CSD166		121/4 x 133/4, 17			
	CSD233		6 x 7			
	CSD344		71/2 x 81/2			
	CSD344		71/2 x 81/2			
	SR(F)033 Bi-Center		121/4 x 131/2			
	SR(F)144 Bi-Center		81/2 x 97/8, 121/4			
	SR(F)333 Bi-Center		43/4 x 55/8, 6 x 7			
	SR(F)133 Bi-Center		105/8 X 111/4	250-3,000	60-200	DGHKMV
	SR(F)233 Bi-Center		63/4 X 77/8	250-3,000	60-200	DGHKMV
	MP33	M243	105/8, 121/4			
	MP32	M143	121/4			
	SD466	S223	121/4			
GeoDiamond	BC27 Bi-Center	S243	23/4X3-	400-2,000	60-600	GMNUmVW
	BC56 Bi-Center	S233	121/4x143/4-	400-2,000	60-600	GMNUmVW
	BC59 Bi-Center	S233	51/2x61/2-	400-2,000	60-600	GMNUmVW
	BC75 Bi-Center	S223	81/2x97/8-	400-2,000	60-600	GMNUmVW
	BC81 Bi-Center	S243	6x7	400-2,000	60-600	GMNUmVW
	BC91 Bi-Center	S223	121/4x123/4-	400-2,000	60-600	GMNUmVW
	BM57 Bi-Center	M132	7x6	400-2,000	60-600	GMNUmVW
	BM73 Bi-Center	M223	121/4x143/4	400-2,000	60-600	GMNUmVW
	M26	M243	33/4	400-2,000	60-600	GMNUmVW
	M27	M432	33/4	400-2,000	60-600	GMNUmVW
	M58	M131	33/4-81/2	400-2,000	60-600	GMNUmVW
	M71	M323	57/8-143/4	400-2,000	60-600	GMNUmVW
	M72	M322	83/8-121/4	400-2,000	60-600	GMNUmVW
	M73	M322	77/8-1214	400-2,000	60-600	GMNUmVW
	M75	M223	12-143/4	500-3,000	60-600	GMNUmVW
	M76	M123	6-63/4	500-3,000	60-600	GMNUmVW
	M83	M421	121/4-171/2	400-2,000	60-600	GMNUmVW
	M87	M223	77/8-83/4	400-2,000	60-600	GMNUmVW
	M88	M223	77/8-121/4	400-2,000	60-600	GMNUmVW
	M90	M223	81/2-121/4	500-2,000	60-400	GMNUmVW
	M91	M123	6-121/4	500-2,000	60-400	GMNUmVW
	MA89	M223	61/8-171/2	500-2,000	60-400	GMNUmVW
	MA99	M223	81/2-121/4	500-2,000	60-400	GMNUmVW
	S71	S223	97/8-143/4	500-2,000	60-400	GMNUmVW
	S73	S223	81/2-171/2	500-2,000	60-400	GMNUmVW
	S82	S223	16-171/2	400-2,000	60-600	GMNUmVW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
Hughes	ABD537	M323	77/8 - 171/2	235-2,500	60-350	GVW
	ABD536	M343	77/8 - 171/2	235-2,500	60-350	GVW
	ABD437	M232	77/8 - 171/2	235-2,500	60-350	GVW
	ABD445	M232	77/8 - 171/2	235-2,500	60-350	GVW
	ATX536	M323	57/8 - 171/2	235-2,500	60-350	GVW
	ATX537	M323	57/8 - 171/2	235-2,500	60-350	GVW
	ATX554	M221	57/8 - 171/2	235-2,500	60-350	GVW
	TX445	M333	57/8 - 171/2	235-2,500	60-350	GW
	TX466	M333	57/8 - 171/2	235-2,500	60-350	GW
	TX488	M333	57/8 - 171/2	235-2,500	60-350	GW
	TX535	M323	57/8 - 171/2	235-2,500	60-350	GW
	TX536	M323	57/8 - 171/2	235-2,500	60-350	GW
	BD535	M323	77/8 - 171/2	235-2,500	60-350	GW
	BX535	M323	57/8 - 171/2	235-2,500	60-350	GMW
	BD536	M323	77/8 - 171/2	235-2,500	60-350	GW
	BX536	M323	77/8 - 171/2	235-2,500	60-350	GMW
	BX445	M323	43/4 - 171/2	235-2,500	60-350	GMW
	BX426	M332	43/4 - 171/2	235-2,500	60-350	GMW
	BD445	M333	77/8 - 171/2	235-2,500	60-350	GW
	BD447	M333	43/4 - 171/2	235-2,500	60-350	GW
	BX447	M333	57/8 - 171/2	235-2,500	60-350	MW
	ABD426	M231	57/8 - 171/2	235-2,500	60-240	GVWUm
	BD554	M323	57/8 - 171/2	235-2,500	60-240	GVWUm
	BD535	M221	43/4 - 171/2	235-2,500	60-240	GVWUm
	BD426	M232	57/8-171/2	235-2,500	60-240	MW
	AG526	M221	81/2 - 171/2	250-2,500	60-240	MVW
	G526	M221	81/2 - 171/2	250-2,500	60-240	MW
	AG554	M121	61/8 - 121/4	235-2,500	60-240	MGVW
	G554	M121	61/8 - 143/4	235-2,500	60-240	MW
	G417	M434	83/4 - 121/4	300-2,500	80-500	MW
	G535	M323	6 - 121/4	300-3,000	60-240	DMW
	G536	M323	77/8 - 171/2	235-2,500	60-240	MDGW
	G435	M332	41/2 - 171/2	300-3,000	60-240	W
	AG435	M332	41/2 - 171/2	300-3,000	60-240	MDVW
	AG445	M333	81/2 - 121/4	300-3,000	60-240	MDVW
	G445	M333	81/2 - 121/4	300-3,000	60-240	MDW
	G488	M333	81/2 - 121/4	300-3,000	60-240	MDHVW
	G536	M323	77/8 - 171/2	300-2,500	60-240	MW
	G445	M432	61/8 - 121/4	300-3,000	60-240	MDW
	STR324	M333	23/4 - 63/4	600-2,500	50-500	MHW
	STR382	M332	23/4 - 63/4	600-2,500	60-500	MHW
	STR386	M332	23/4 - 63/4	500-3,000	60-500	MHW
	STR426	M231	31/8 - 63/4	300-2,000	60-500	MHW
	STR438	M333	31/8 - 63/4	500-2500	60-500	MHW
	STR445XL	M332	31/8 - 63/4	500-2,500	100-500	MHW
	STR445XTR	M231	61/4	500-2,400	100-500	MHW
	STR482	M232	31/8 - 63/4	500-2,000	60-500	MHW
	STR486	M233	31/8 - 63/4	500-2,500	60-500	MHW
	STR554	M221	6 - 63/4	300-2,000	60-500	MHW
	STR536	M224	6 - 63/4	300-2,000	60-500	MHW
	STX324	M333	23/4 - 63/4	300-2,000	60-500	MHW
	STX382	M332	23/4 - 63/4	300-2,000	60-500	MHW
	STX386	M332	23/4 - 63/4	300-2,000	60-500	MHW
	STX405	M231	31/8 - 63/4	300-2,000	60-500	MHW
	STX406	M332	31/8 - 63/4	300-2,000	60-500	MHW
	STX407	M333	31/8 - 63/4	300-2,000	60-500	MHW
	STX606	M224	6 - 63/4	600-2500	60-500	MHW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
Hycalog	DS34H	S223	83/8-171/2	350-3,000	Variable	GHMWUmV
	DS35	M232	37/8-41/8	350-3,000	Variable	GHMWUmV
	DS46H	S233	57/8-171/2	350-3,000	Variable	GHMWUmV
	DS49H	S233	33/4-121/4	350-3,000	Variable	GHMWUmV
	DS49D	S233	77/8-121/4	350-3,000	Variable	GHMWUmV
	DS56H	M432	511/16-121/4	350-3,000	Variable	GHMWUmV
	DS57H	M421	121/4	350-3,000	Variable	GHMWUmV
	DS59H	M332	6-143/4	350-3,000	Variable	GHMWUlV
	DS69	S323	6-63/4	350-3,000	Variable	GHMUlV
	DS69H	S323	115/8-171/2	350-3,000	Variable	GHMUlV
	DS69D	S323	171/2	350-3,000	Variable	GHMUlV
	DS74	S343	23/4-55/8	350-3,000	Variable	GHMWUmV
	DS76	S223	121/4	350-3,000	Variable	GHMWUmV
	DS78	M433	121/4	350-3,000	Variable	GHMWUmV
	DS80	S223	121/4	350-3,000	Variable	GHMWUmV
	DS86	S323	81/2-171/2	350-3,000	Variable	GHMWUmV
	DS95	M232	61/2	350-3,000	Variable	GHMWUmV
	DS97H	M421	83/8-121/4	350-3,000	Variable	GHMUmV
	DS99H	M421	61/2	350-3,000	Variable	GHMWUlV
	DS99D	M421	61/8	350-3,000	Variable	GHMWUlV
	DS101H	S333	105/8 x 121/4-	350-3,000	Variable	GHMUmV
	DS106H	S233	77/8-121/4	350-3,000	Variable	GHMWUmV
	DS106D	S233	81/2-121/4	350-3,000	Variable	GHMWUmV
	DS115	S221	61/8	350-3,000	Variable	GHMUmV
	DS116	M231	81/2	350-3,000	Variable	GHMUmV
	DS119H	M332	97/8	350-3,000	Variable	GHMWUmV
	DS123H	S233	121/4	350-3,000	Variable	GHMWUmV
	DS123D	S233	121/4	350-3,000	Variable	GHMWUmV
	DS128	M133	61/8-61/4	350-3,000	Variable	GHMUmV
	DS134	M223	77/8-83/4	350-3,000	Variable	GHMWUmV
	DS134H	M223	77/8-121/4	350-3,000	Variable	GHMWUmV
	DS140	S323	121/4	350-3,000	Variable	GHMWUmV
	DS145H	M222	81/2	350-3,000	Variable	GHMWUmV
	DS147	M223	77/8-97/8	350-3,000	Variable	GHMWUmV
	DS154	S243	43/8 x 43/4	350-3,000	Variable	GHMWUmV
	DS166	M223	77/8	350-3,000	Variable	GHMWUmV
Kingdream	B461	M232	57/8,81/2,91/2,121	500-2,500	80-600	
	B534	M312	81/2,121/4	500-2,500	80-600	
	BW441	M222	81/2,91/2,121/4	800-3,000	80-250	
	BW461	M232	81/2	800-3,000	80-250	
	BH441	M222	81/2,91/2,121/4	1,000-3,000	80-250	
	BH461	M232	81/2,121/4	1,000-3,000	80-250	
RockBit	KDM33	S232	43/4, 61/4, 77/8,	500-3,000	80-1,000	M
	KD3619	S233	6,61/8,61/4,77/8,8	500-3000	60-400	GHMVW
	KD4719	S333	77/8,81/2,83/4,97/	500-3000	60-400	GHMVW
	KDS22	S222	23/4,37/8,43/4,	500-3,000	80-500	M
	KD4413	S233	43/4,6,61/8,61/4,7	500-3000	60-400	GHMVW
	334HF	S123	6, 61/8, 61/4,	500-3,000	70-350	GUI
	435HF	S123	77/8, 81/2,8 3/4	500-3,000	70-350	GUmM
Security DBS	HZ23-2	M232	53/4, 6, 61/8, 61/2,	500-2,500	80-450	HM
	TD19H	M223	77/8, 83/8, 83/4,	200-3,500	60-400	M
	HZ23-1	M342	31/2, 37/8, 41/8,	500-2,500	80-450	HM
	FM2943	M333	97/8, 12, 121/4,	500-2,500	60-400	MVW
	FM2865	M423	121/4	500-2,500	60-400	MVW
	FM2745	M433	77/8, 83/8, 81/2,	500-2,500	60-400	MVW
	FM2765	M324	121/4	500-2,500	60-400	MVW
	FM2846	M433	81/2, 83/4	500-2,500	60-400	MVW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
PDC Drill Bits						
Security DBS	FM2841	M433	83/8, 81/2	500-2,500	60-400	MVW
	FM2943	M333	12, 121/4, 143/4	500-2,500	60-400	MVW
	B35+2	M432	57/8, 6, 61/4, 63/4,	1,500-3,000	80-350	MW
	HZ35+2	M432	57/8, 6, 61/8, 81/2,	1200-2700	80-450	HMW
	FM2443	M333	6, 61/2	500-2,500	60-400	MVW
	FM2445	M334	6	500-2,000	60-400	MVW
	FM2461	M222	121/4	500-2,000	60-400	MVW
	FM2545	M433	77/8	500-2,500	60-400	MVW
	FM2545	M333	83/4, 97/8	500-2,500	60-400	MVW
	FM2546	M433	81/2	500-2,500	60-400	MVW
	FM2641	M232	6, 61/8	500-2,500	60-400	MVW
	FM2641	M432	63/4	500-2,500	60-400	MVW
	FM2641	M332	61/2	500-2,500	60-400	MVW
	FM2645	M333	77/8, 83/4	500-2,500	60-400	MVW
	FM2653	M423	77/8	500-2,500	60-400	MVW
	FM2655	M424	83/4	500-2,500	60-400	MVW
	FM2665	M423	77/8, 81/2, 83/4	500-2,500	60-400	MVW
	FM2665	M323	97/8	500-2,500	60-400	MVW
	FM2743	M333	121/4	500-2,500	60-400	MVW
	FM2753	M323	121/4	500-2,500	60-400	MVW
	FM2633	M443	61/8, 61/4, 61/2,	500-2,000	60-400	MVW
	FM2631	M442	6	500-2,000	60-400	MVW
	FS2743	S243	121/4	500-2,000	60-400	MVW
	FS2863	S223	16, 171/2	500-2,000	60-400	MVW
	FS2963	S223	16	500-2,000	60-400	MVW
	FM2765	M424	97/8	500-2,500	60-400	MVW
	FM2765	M324	121/4	500-2,500	60-400	MVW
	SE3641	M332	6	500-2,500	60-400	DVW
Tri-Max	S-1H	S316	77/8-171/2	1,000-4,000	85-250	DGM
	Q-1L	S544	6-171/2	1,000-3,000	85-250	DG
	Q-1	S545	57/8-171/2	1,000-4,000	85-250	DGM
	S645	S645	6-171/2	1,000-4,000	85-300	GM
	HZ-90	S974	41/2-121/4	500-3,000	100-400	GHM
Varel	447	M123	63/4-83/4	500-2,000	60-400	GMW
	467	M223	97/8-121/4	500-2,000	60-400	GMW
	507	M323	121/4-143/4	500-2,000	60-400	GMW
	587	M323	81/2-121/4	500-2,000	60-400	GMW
	577	M323	81/2-121/4	500-2,000	60-400	GMW
	557	M323	77/8-121/4	500-2,000	60-400	GMW
	637	M223	77/8-83/4	500-2,000	60-400	GMW
	667	M223	77/8-83/4	500-2,000	60-400	GMW
	697	M223	77/8-83/4	500-2,000	60-400	GMW
	445	M233	57/8-83/4	500-2,000	60-400	GMW
	635	M232	61/8-63/4	500-2,000	60-400	GMW
	665	M333	77/8-83/4	500-2,000	60-400	GMW
	BP5	M432	121/4 x 105/8	500-2,500	60-400	GMW
	S250	M223	83/8, 81/2, 83/4,	400-2,000	80-250	GIMUm
	LD327	M232	53/4, 57/8, 6, 61/8,	400-2,000	80-500	GIMUl
	LD327	M232	81/2, 83/4, 97/8,	400-2,000	80-500	GIMUl
	S75	M422	171/2	400-2,000	80-250	GIMUm
	RD50	M323	83/8, 81/2, 83/4,	400-2,000	80-500	GIMUm
	S265	M424	83/8, 81/2, 83/4,	400-2,000	80-500	GIMUm
	RD90 H	M433	41/8, 53/4, 57/8, 6,	400-2,000	80-500	GIMUm
	RD90 H	M433	81/2, 83/4, 97/8,	400-2,000	80-500	GIMUm
	RD90 HY	M433	41/8, 53/4, 57/8, 6,	400-2,000	80-500	GIMUm
	RD90 HY	M433	81/2, 83/4, 97/8,	400-2,000	80-500	GIMUm
	LD548H	M424	83/8, 81/2, 83/4,	400-2,000	80-500	GIMUm
	S270	M322	53/4, 57/8, 6, 61/8,	400-2,000	80-500	GIMUm
	S270	M322	77/8, 83/8, 81/2,	400-2,000	80-500	GIMUm
	K100	M432	53/4, 57/8, 6, 61/8,	400-2,000	80-500	DGHMUh
	K100	M432	77/8, 83/8, 81/2,	400-2,000	80-500	DGHMUh
	MKS56		81/2, 121/4	400-2,000	80-500	GIMUm

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
Hughes	MX-20	517	83/8, 81/2, 83/4,	1,000-6,000	220-40	BGMW
	MX-20	517	97/8, 12, 121/4,	1,000-6,000	220-40	BGMW
	MX-20G	517	83/8, 81/2, 83/4,	1,000-6,000	220-40	BGMW
	MX-20C	517	81/2, 91/2	1,000-6,000	220-40	BGMW
	MX-20H	517	81/2, 97/8	1,000-6,000	220-40	BGMW
	MX-28	527	83/4, 91/2, 12,	1,000-6,000	220-40	BGMW
	MX-30	537	81/2, 97/8, 171/2	1,000-6,000	220-40	BGMW
	MX-35C	547	81/2, 12	1,000-6,000	220-40	BGMW
	MX-30G	537	83/8, 81/2, 83/4,	1,000-6,000	220-40	BGMW
	MX-35CG	547	83/8, 81/2	1,000-6,000	220-40	BGMW
	HX-20	517	7 7/8	1,000-6,000	220-50	EGW
	HX-30	537	7 7/8	1,000-6,000	220-50	EGW
	H-20	517	77/8, 81/2, 83/4,	1,000-6,000	220-50	EGW
	H-20B	517	7 7/8	1,000-6,000	220-50	EGW
	H-20C	527	77/8, 11	1,000-6,000	220-50	EGW
	H-28	527	8 3/4	1,000-6,000	220-50	EGW
	H-30	537	77/8, 81/2, 83/4,	1,000-6,000	220-50	EGW
	H-30C	537	8 3/4	1,000-6,000	220-50	EGW
	H-30CG	537	8 1/2	1,000-6,000	220-50	EGW
	GT-20	517	77/8, 81/2, 83/4,	2,000-6,000	120-50	W
	GT-20C	527	77/8, 81/2, 83/4,	2,000-6,000	120-50	WY
	GT-20S	517	77/8, 83/4	2,000-6,000	120-50	W
	STX-20	517	33/4, 6, 61/8, 61/4	2,000-5,000	250-80	GHW
	STX-20G	517	6 1/8	2,000-5,000	250-80	GHW
	STR-30C	537	43/4, 61/8, 61/2,	2,000-5,000	250-80	GHW
	STR-35C	547	41/2	2,000-5,000	250-80	GHW
	STR-30	537	37/8, 41/8, 43/4,	2,000-5,000	250-80	GHW
	STR-30	537	6, 61/8, 61/4, 61/2	2,000-5,000	250-80	GHW
	GT-28	527	77/8, 121/4	2,000-5,000	110-40	W
	GT-28C	527	77/8, 11, 121/4	2,000-5,000	110-40	W
	GT-30	537	77/8, 83/4, 91/2,	2,000-5,000	110-40	W
	GT-30C	547	77/8, 81/2	2,000-5,000	110-40	W
	GT-30H	547	8 1/2	2,000-6,000	120-50	W
	GT-35	547	8 3/4	2,000-5,000	110-40	W
	GTX-20	515	171/2, 24, 26	3,000-5,500	120-40	Y
	GTX-20C	525	16	3,000-5,500	120-40	Y
	GTX-20G	527	23	3,000-5,500	120-40	Y
	GTX-30C	545	81/2	3,000-5,500	120-40	Y
	GTX-30H	545	17 1/2	3,000-5,500	120-40	Y
Industrial	SMKGJ	537	53/4-121/4	3,500-5,000	40-80	
Kingdream	GA515	515	171/2	1,000-4,500	200-80	CEGL
	GAT515	515	171/2	1,000-4,500	200-80	CEGL
	GJ515	515	171/2	1,000-4,500	300-80	CEGL
	GJT515	515	171/2	1,000-4,500	300-80	CEGL
	H517	517	81/2,91/2,121/4	2,500-5,000	100-45	CEGL
	HT517	517	81/2	2,500-5,000	100-45	CEGL
	HA517	517	57/8,6,61/2,77/8,8	2,000-6,000	120-50	CEGL
	HB517	517	81/2,121/4	2,500-5,000	100-45	CEGL
	HAD517	517	77/8,81/2,91/2,121	2,000-6,000	120-60	CEGL
	HAT517	517	77/8,81/2,91/2,121	2,000-6,000	120-60	CEGL
	HJ517	517	81/2,91/2,121/4	2,000-6,000	240-50	CEGL
	HJT517	517	91/2	2,000-6,000	240-50	CEGL
	HJD517	517	81/2	2,000-6,000	240-50	CEGL
	HFT517	517	121/4	1,000-5,000	250-60	CEGL
	H527	527	121/4	2,500-5,000	100-45	CEGL
	HA527	527	57/8,61/8,81/2,121	2,000-6,000	120-50	CEGL
	HAT527	527	121/4	2,000-6,000	120-50	CEGL

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
New Tech	NT11C	517Y	77/8	2,000-5,000	60-180	CGLM
	NT15XSM	517X	77/8, 83/4	2,000-5,000	60-180	CGLM
	NT15XS	517X	77/8	2,000-5,000	60-180	CGHLM
	NT15F	517X	77/8	2,000-5,000	60-180	CGLM
	NT17CM	517Y	77/8	2,000-5,000	60-180	CGLM
	NT2	517X	61/8, 61/4, 77/8,	2,000-5,000	60-180	CGHLM
	NT2C	527Y	77/8, 83/4, 97/8	2,000-5,000	60-180	CGLM
	NT27I	527Y	77/8	2,000-5,000	60-180	CGLM
	NT27H	527Y	77/8	2,000-5,000	60-180	CGLM
	NT3	537X	61/8, 61/4, 77/8,	3,000-6,000	60-200	CGLM
	NT3C	547Y	77/8, 83/4, 97/8	3,000-6,000	40-180	CGLM
	NT35CX	547Y	77/8	3,000-6,000	50-180	CGLM
	NT3CT	547Y	83/4	2,000-5,000	40-160	CEGLMT
RBI/Gearhart	C2	517X	37/8, 43/4, 51/2,	2,000-5,000	240-50	ACEGHLMT
	C2	517X	61/2, 63/4, 77/8,	2,000-5,000	240-50	ACEGHLMT
	B2LRGSP	517X	41/8, 41/2, 43/4,	2,000-5,000	240-50	AGHLM
	B2LRGSP	517X	57/8, 6, 61/8, 61/4,	2,000-5,000	240-50	AGHLM
	C2A	517X	77/8	2,000-5,000	240-50	ACEHLM
	C2H	517X	77/8, 83/4	2,000-5,000	240-50	ACEHLM
	C2LRGSP	517X	37/8, 43/4, 51/2,	2,000-5,000	240-50	ACEGHLMT
	C2LRGSP	517X	61/2, 63/4, 77/8,	2,000-5,000	240-50	ACEGHLMT
	C2VLRGSP	517X	57/8, 6, 51/8, 61/4,	2,000-5,000	240-50	ACEGHLMT
	C2VLRGSP	517X	77/8, 81/2, 83/4,	2,000-5,000	240-50	ACEGHLMT
	C27	527Y	57/8, 6, 51/8, 61/4,	2,000-5,000	240-50	ACEGHMT
	C27	527Y	77/8, 81/2, 83/4,	2,000-5,000	240-50	ACEGHMT
	C27LRGSP	527Y	57/8, 6, 51/8, 61/4,	2,000-5,000	240-50	ACEGHMT
	C27LRGSP	527Y	77/8, 81/2, 83/4,	2,000-5,000	240-50	ACEGHMT
	C3	537X	37/8, 43/4, 51/2,	2,500-5,500	240-50	ACEGHLM
	C3	537X	61/2, 63/4, 77/8,	2,500-5,500	240-50	ACEGHLM
	C3LRGSP	537X	37/8, 43/4, 51/2,	2,500-5,500	240-50	ACEGHLM
	C3LRGSP	537X	61/2, 63/4, 77/8,	2,500-5,500	240-50	ACEGHLM
	B3LRGSP	537X	43/4, 6, 61/8, 61/4,	2,500-5,500	240-50	AGHLM
	C3VLRG	537X	43/4, 57/8, 6, 61/8,	2,500-5,500	240-50	ACEGHM
	C3VLRG	537X	63/4, 77/8, 81/2,	2,500-5,500	240-50	ACEGHM
	C33	537X	77/8	2,000-5,000	240-50	ACGHLM
	C37	537Y	57/8, 6, 61/8, 61/4,	2,500-5,500	240-50	ACEGHLM
	C37	537Y	63/4, 77/8, 81/2,	2,500-5,500	240-50	ACEGHLM
	C37LRGSP	537Y	57/8, 6, 61/8, 61/4,	2,500-5,500	240-50	ACEGHM
	C37LRGSP	537Y	63/4, 77/8, 81/2,	2,500-5,500	240-50	ACEGHM
	C37LRGSP	537Y	51/2, 55/8, 71/2,	2,500-5,500	240-50	ACEGHM
	B37LRGSP	537Y	43/4, 6, 61/8, 61/4,	2,500-5,500	240-50	AGHLM
Reed	MHP51H	515M	83/4	2,000-5,000	350-60	GMNX
	EMS51AC	515M	16, 171/2	2,000-5,000	350-60	GMNX
	EMS51H	515M	12 1/4	2,000-5,000	350-60	GMNX
	EMS51HDH	515M	12 1/4	2,000-5,000	350-60	GMNX
	EMS51HC	515M	143/4	2,000-5,000	450-60	CGMNY
	EMS51ACDH	515M	16, 171/2	2,000-5,000	350-60	GMNWX
	EMS51HCDH	515M	143/4	2,000-5,000	450-60	CGMNY
	EHP51AFDH	517W	81/2	2,000-5,000	200-60	GWX
	SL51H	517	41/2, 57/8, 6, 6	2,000-5,000	200-60	X
	SL51HDG	517	4 3/4, 61/8	2,000-5,000	200-60	X
	SL51HDH	517W	5 7/8, 6, 6 3/4	2,000-5,000	200-60	WX
	SL51HF	517	6 1/4	2,000-5,000	200-60	X
	SL51HFDH	517	6	2,000-5,000	200-60	X
	EHP51ADH	517W	81/2, 9 7/8	2,000-5,000	200-60	GWX
	EHP51AFDGH	517W	81/2	2,000-5,000	200-60	GWX
	EHP51ADGH	517W	81/2	2,000-5,000	200-60	GWX

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
Reed	EHP51	517	81/2	2,000-5,000	200-60	Y
	EHP51A	517	81/2, 83/4, 97/8	2,000-5,000	200-60	X
	EHP51H	517	41/2, 57/8, 6, 6	2,000-5,000	200-60	X
	EHP51H	517	61/2, 63/4, 105/8,	2,000-5,000	200-60	X
	EHP51HDG	517	61/8	2,000-5,000	200-60	X
	EHP51HDGH	517	12 1/4	2,000-5,000	200-60	X
	EHP51HDH	517W	5 7/8, 6, 6 3/4,	2,000-5,000	200-60	WX
	EHP51HFDH	517	6, 121/4	2,000-5,000	200-60	X
	EHP51X	517	83/4	2,000-5,000	200-60	X
	HP51	517	81/2, 97/8, 121/4	2,000-5,000	200-60	Y
	HP51A	517	77/8 ,81/2, 83/4,	2,000-5,000	200-60	X
	HP51ADH	517	12 1/4	2,000-5,000	200-60	X
	HP51A-M	517	77/8	2,000-5,000	200-60	X
	HP51H	517	77/8, 83/8, 83/4,	2,000-5,000	200-60	X
	HP51H-M	517	77/8	2,000-5,000	200-60	X
	HP51X	517	77/8, 83/4	2,000-5,000	180-60	X
	HP51X-M	517	77/8	2,000-5,000	180-60	X
	EHP52HT	527	12 1/4	2,000-5,500	180-50	Y
	HP52	527	7/8, 83/4	2,000-5,500	180-50	Y
	HP52-M	527	77/8	2,000-5,500	180-50	Y
	HP52A	527	77/8, 83/4	2,000-5,500	180-50	X
	HP52A-M	527	77/8	2,000-5,500	180-50	X
	HP52X	527	7 7/8, 83/4	2,000-5,500	180-50	X
	EMS53AC	535M	143/4	2,000-5,000	450-50	MGX
	EMS53ACDH	535M	143/4	2,000-5,000	450-50	MGX
	MS53C	535M	171/2	2,000-6,000	350-60	Y
	MS53CDH	535M	171/2	2,000-6,000	350-60	GY
	MHP53A	535M	83/8, 12	2,000-6,000	350-60	GY
	SL53	537	57/8, 6, 61/8, 6 1/4	2,000-6,000	90-50	Y
	SL53A	537	4 3/4, 57/8, 6,	2,000-6,000	90-50	X
	SL53ADG	537W	4 3/4, 61/8	2,000-6,000	90-50	GX
	SL53ADGH	537W	6	2,000-6,000	90-50	GX
	SL53ADH	537W	6	2,000-6,000	90-50	GX
	SL53DGH	537W	6, 6 1/2	2,000-6,000	90-50	GX
	SL53DH	537W	6	2,000-6,000	90-50	GY
	EHP53	537	57/8, 6, 61/8, 6	2,000-6,000	90-50	Y
	EHP53	537	81/2, 83/4, 97/8,	2,000-6,000	90-50	Y
	EHP53DH	537W	97/8, 121/4	2,000-6,000	90-50	GY
	EHP53A	537	57/8, 61/8, 6 1/4,	2,000-6,000	90-50	X
	EHP53A	537	63/4, 81/2, 83/4,	2,000-6,000	90-50	X
	EHP53ADH	537W	6 3/4, 8 1/2, 8 3/4,	2,000-6,000	90-50	GX
	EHP53ADGH	537W	83/4, 12 1/4	2,000-6,000	90-50	GX
	EHP53ADG	537W	61/8, 83/4	2,000-6,000	90-50	GX
	EHP53DGH	537W	6 1/2, 8 1/2	2,000-6,000	90-50	GX
	EHP53AK	537W	43/4, 5 1/2	2,000-6,000	90-50	GX
	HP53	537	77/8, 83/8, 81/2,	2,000-6,000	90-50	Y
	HP53A	537	37/8, 77/8, 83/8,	2,000-6,000	90-50	X
	HP53A	537	83/4, 97/8, 12,	2,000-6,000	90-50	X
	HP53AF	537	3 7/8	2,000-6,000	90-50	X
	HP53DH	537	81/2, 83/4	2,000-6,000	90-50	Y
	HP53H	537	77/8	2,000-6,000	90-50	Y
	HP53A-M	537	77/8	2,000-6,000	90-50	X
	HP53X	537	77/8	2,000-6,000	90-50	X
	HP53-JA	537A	77/8	2,000-6,000	90-50	AGX
	HP53ADG	537W	77/8, 83/4	2,000-6,000	90-50	GX
	HP53ADGH	537W	83/8	2,000-6,000	90-50	GWX
	HP53ADH	537W	83/8, 83/4	2,000-6,000	90-50	GX
	HP54	547	77/8	2,500-7,500	90-50	Y

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
Security DBS	XT(D)18 - XT(D)23	515	131/2, 143/4, 16, 26, 28	1,000-5,000	80-200	BW
	XS(D)18 - XS(D)23	517	43/4, 57/8, 6, 61/8, 81/2, 83/4, 97/8,	1,000-5,000	80-200	BW
	XL(D)18 - XL(D)23	517	97/8, 105/8, 121/4	1,000-5,000	80-200	BWC
	XT(D)24 - XT(D)27	525	131/2, 143/4, 16, 26, 28	1,000-5,000	80-200	BW
	XS(D)24 - XS(D)27	527	43/4, 57/8, 6, 61/8, 81/2, 83/4, 97/8,	1,000-5,000	80-200	BW
	XL(D)24 - XL(D)27	527	97/8, 105/8, 121/4	1,000-5,000	80-200	BWC
	XT(D)28 - XT(D)33	535	131/2, 143/4, 16, 26, 28	1,000-5,000	80-200	BW
	XS(D)28 - XS(D)33	537	43/4, 57/8, 6, 61/8, 81/2, 83/4, 97/8,	1,000-5,000	80-200	BW
	XL(D)28 - XL(D)33	537	97/8, 105/8, 121/4	1,000-5,000	80-200	BWC
	XT(D)34 - XT(D)39	545	131/2, 143/4, 16, 26, 28	1,000-5,000	80-200	BW
	XS(D)34 - XS(D)39	547	43/4, 57/8, 6, 61/8, 81/2, 83/4, 97/8,	1,000-5,000	80-200	BW
	XL(D)34 - XL(D)39	547	97/8, 105/8, 121/4	1,000-5,000	80-200	BWC
Smith	A1JSL	515T	16	1,000-3,000	50-280	XHMT
	MA1SL	515T	121/4-16	1,000-4,000	50-280	XHMT
	20GM	515X	121/4-171/2	2,000-5,000	50-280	XHMGW
	20GMD	515X	121/4-171/2	2,000-5,000	50-280	XHMGW
	MG20Q	515X	171/2	2,000-5,000	50-280	XHMG
	M2S	515X	121/4-22	2,000-5,000	50-280	XHM
	M2SD	515X	121/4-171/2	2,000-5,000	50-280	XHMW
	M2SOD	515X	121/4-171/2	2,000-5,000	50-280	XHMW
	A1	517T	77/8-83/4	1,000-4,000	40-100	XT
	20MF	517X	83/8-121/4	2,000-5,000	50-250	XHMGW
	20MFD	517X	83/8-121/4	2,000-5,000	50-250	XHMGW
	20GF	517X	121/4	2,000-5,000	50-250	XHMGW
	20GFD	517X	121/4	2,000-5,000	50-250	XHMGW
	20MFDY	517Y	8 1/2	2,000-5,000	50-250	YHMGW
	25MF	517X	8 1/2	2,000-5,000	50-250	XHMGW
	XR20T	517X	6-63/4	2,000-5,000	50-300	XHM
	XR20HTDG	517X	6-63/4	2,000-5,000	50-300	XHMW
	XR20TY	517Y	6-63/4	2,000-5,000	50-300	YHM
	F15H	517X	77/8-115/8	2,000-5,500	50-160	X
	F15HT	517X	9 5/8	2,000-5,000	50-160	X
	F2	517X	61/4-143/4	2,000-5,000	50-160	X
	F20T	517X	30 1/4	2,000-5,000	50-160	X
	F25	517X	77/8-121/4	2,000-6,000	50-160	X
	F25A	517X	9 5/8	2,000-6,000	50-160	XA
	F25OD	517X	121/4	2,000-6,000	50-160	XW
	F2D	517X	121/4	2,000-5,000	50-160	XW
	F2H	517X	77/8-115/8	2,000-5,000	50-160	X
	F2OD	517X	81/2-121/4	2,000-5,000	50-160	XW
	MF15H	517X	57/8	2,000-5,000	50-250	XHM
	MF15HT	517X	77/8	2,000-5,000	50-250	XHM
	MF2	517X	51/2-121/4	2,000-5,000	50-250	XHM
	MF20T	517X	81/2	2,000-5,000	50-250	XHM
	MF25T	517X	81/2	2,000-5,000	50-250	XHM
	MF2D	517X	83/8-97/8	2,000-5,000	50-250	XHMW

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
Smith	F17	517Y	77/8-121/4	2,000-6,000	50-160	Y
	M27D	525Y	121/4	2,000-5,000	50-280	YHMW
	20MFYD	527Y	81/2	2,000-5,000	50-250	YHM
	28MFYODPD	527Y	97/8	2,000-5,000	70-250	YHMGW
	XR20TY	527Y	6-63/4	2,000-5,000	50-300	YHM
	F27	527Y	77/8-121/4	2,000-7,000	50-160	Y
	F27A	527Y	77/8	2,000-7,000	50-160	YA
	F27D	527Y	81/2-121/4	2,000-6,000	50-160	YW
	F27I	527Y	77/8-83/4	2,000-7,000	50-160	Y
	F26Y	527Y	77/8	2,000-7,000	50-160	Y
	F28Y	527Y	97/8	2,000-7,000	50-160	Y
	MF27	527Y	81/2-121/4	2,000-6,000	50-250	YHM
	MF27D	527Y	81/2-121/4	2,000-6,000	50-250	YHMW
	M3S	535X	121/4	2,000-5,000	50-280	XHM
	M3SOD	535X	121/4-171/2	2,000-5,000	50-280	XHMW
	30MF	537X	83/8-81/2	2,500-6,000	50-250	XHMGW
	30MFD	537X	81/2	2,000-6,000	50-250	XHM
	XR30T	537X	6-63/4	2,000-6,000	50-300	XHM
	F3	537X	57/8-121/4	2,500-6,000	50-160	X
	F3D	537X	6-121/4	2,500-6,000	50-160	XW
	F3H	537X	77/8-83/4	2,500-7,000	50-160	X
	F3HOD	537X	77/8-83/4	2,500-7,000	50-160	XW
	F3OD	537X	6-121/4	2,500-6,000	50-160	XW
	MF3	537X	37/8-81/2	2,500-6,000	50-250	XHM
	F30T	537X	8 3/4	2,500-6,000	50-160	X
	MF30T	537X	81/2	2,500-6,000	50-250	XHM
	MF3D	537X	81/2	2,000-6,000	50-250	XHMW
	MF3H	537X	83/4-97/8	2,500-6,500	50-250	XHM
	MF3OD	537X	81/2-97/8	2,500-6,000	50-250	XHMW
	F35	547X	77/8-83/4	2,500-6,000	50-160	X
	F35A	547X	77/8	2,500-6,000	50-160	XA
	F37	547Y	6-121/4	3,000-7,000	50-160	Y
	F37A	547Y	61/4-77/8	3,000-7,000	50-160	YA
	F37D	547Y	61/8-121/4	3,000-7,000	50-160	YW
	F37DDPD	547Y	83/4	3,000-7,000	50-160	YW
	F37H	547Y	77/8-83/4	3,000-7,000	50-160	Y
	F37OD	547Y	61/2-81/2	3,000-7,000	50-160	YW
	MF37	547Y	45/8-81/2	2,000-5,000	50-250	YHM
	MF37D	547Y	43/4-83/8	2,500-6,000	50-250	YHMW
	MF37DDPD	547Y	43/4	2,000-5,000	50-250	YHMW
	XR30TY	547Y	6-63/4	2,000-6,000	50-300	YHM
	XR30YD	547Y	6-63/4	2,000-6,000	50-300	YHMW
	XR30TYD	547Y	6-63/4	2,000-6,000	50-300	YHMW
TIX	XZ20G	515X	121/4	1,500-4,500	70-150	GX
	XZ20G	515X	171/2	1,500-4,000	70-150	GX
	Z20G	515X	81/2	1,500-4,500	50-100	GX
	Z20G	515X	20, 22, 24, 28	1,000-3,000	50-100	GX
	X20G	517X	55/8, 57/8, 6, 61/4,	1,500-4,000	60-120	GX
	X20G	517X	81/2, 83/4, 105/8,	2,000-5,000	60-120	GX
	X20G	517X	151/2	1,500-4,500	60-120	GX
	M20GP	517X	6	1,000-4,500	60-250	GLMX
	M20GP	517X	81/2, 121/4	1,000-5,000	60-250	GLMX
	K30G	537X	37/8, 4	1,000-2,500	50-60	GX
	M30GP	537X	81/2, 121/4	1,000-5,500	60-250	GLMX
	X30G	537X	43/4, 5, 51/8	1,000-3,500	50-70	GX
	X30G	537X	55/8-77/8	2,000-4,500	50-110	GX
	X30G	537X	81/2-121/4	2,500-5,500	50-110	GX
	X30G	537X	143/4, 151/2,	2,000-4,500	50-110	GX
	XZ30G	535X	121/4	2,000-5,000	50-150	GX
	XZ30G	535X	171/2	2,000-4,500	60-150	GX
	Z30G	535X	81/2	2,000-5,000	45-100	GX
	Z30G	535X	20, 22, 24	1,500-3,500	45-100	GX
	MZ20GP	515X	16, 171/2	1,500-4,000	60-250	GLMX

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Insert Roller Cone Bits						
Tri-Max	TM515	515	6-171/2	2,000-4,000	80-150	
	TM517	517	6-171/2	2,000-5,000	65-120	
	TM527	527	6-171/2	2,000-5,000	65-120	
	TM537	537	6-171/2	2,000-5,000	65-120	
	TM545	545	6-171/2	2,000-4,000	80-150	
	TM547	547	6-171/2	2,500-5,000	65-120	
Varel	V515	515X	26	2,500-4,500	175-80	
	V517	517X	171/2	2,500-5,000	110-50	
	ETR24	515X	115/8, 121/4,	2,500-4,500	250-80	W
	ETD24	517X	37/8-121/4	2,500-5,000	140-70	W
	ETD24E	517X	37/8-61/4	2,500-5,000	140-70	W
	ETD24G	517X	83/8	2,500-5,000	140-70	GW
	ETD25	517Y	77/8, 81/2, 83/4,	2,500-5,000	140-70	W
	ETD27	527Y	77/8	2,500-5,000	140-70	W
	ETR28	525X	171/2	2,500-5,000	200-60	W
	ETD28	527X	77/8, 81/2, 121/4	3,000-5,500	120-60	W
	V527	527X	77/8	2,500-5,000	100-50	
	V527B	527X	77/8	2,500-5,000	100-50	
	ETD29	527Y	77/8, 11, 121/4	3,000-5,500	120-60	W
	ETD29E	527Y	77/8	3,000-5,500	120-60	W
	ETR34	535X	171/2	3,000-5,000	200-60	W
	ETD34	537X	37/8-121/4	3,000-6,500	100-50	W
	ETD35	547Y	37/8-121/4	3,000-7,000	90-50	W
	ETD35A	547Y	61/4-77/8	3,000-5,500	80-50	AW
	ETR38	547X	171/2	3,500-6,000	160-60	W
Steel Tooth Roller Cone Bits						
Industrial	M	211	73/8-227/8	4,000-8,000	40-100	
	SM	131	45/8-171/2	3,500-6,000	60-100	
	SMD	133	6, 81/2	3,500-6,000	60-100	
	SMDGJ	137	67/8-121/4	3,500-6,000	60-100	
	SMDJ	133	71/2-171/2	3,500-6,000	60-100	
	SMJ	131	61/2-171/2	3,500-6,000	60-100	
Security DBS	XN3	131	131/2, 143/4, 16,	1,000-4,000	80-200	
	XT3	135	131/2, 143/4, 16,	1,000-4,000	80-200	G
	XS3	137	43/4, 57/8, 6, 61/8,	1,000-4,000	80-200	
	XS3	137	61/2, 63/4, 77/8,	1,000-4,000	80-200	
	XL3	137	97/8, 105/8, 121/4	1,000-4,000	80-200	
Smith	V2J	211	5 7/8-6 1/8	1,500-6,000	80-180	
TIX	MSS	131	57/8, 6, 61/8, 61/4,	1,500-4,000	60-130	
	MSS	131	83/8, 81/2, 85/8,	1,500-5,000	60-130	
	MSS	131	97/8, 105/8, 11,	1,500-5,000	60-130	
	MSS	131	133/8, 133/4,	1,500-4,000	60-130	
	MSS	131	22, 23, 24, 26	1,500-4,000	60-130	
	MSS-X	136	57/8, 6, 61/8, 61/4,	2,000-4,000	60-120	B
	MSS-X	136	83/8, 81/2, 83/4,	2,000-5,000	60-120	B
	MSS-X	136	115/8, 12, 121/4	2000-5,000	60-120	B
	MSS-X	136	151/2, 171/2	2000-4,000	60-120	B
	MSS-TX	137	57/8, 6, 77/8	2,000-4,500	60-120	BG
	MSS-TX	137	81/2, 97/8, 115/8,	2,000-5,000	60-120	BG
	MSS-TZ	135	83/8, 81/2, 95/8,	2,000-4,500	60-120	G
	MSS-Z	134	83/8, 81/2, 95/8,	2,000-4,500	60-110	G
	MSS-Z	134	121/4	2,000-4,500	60-110	G
	MSS-Z	134	171/2	1,500-3,500	60-110	G
	MSS-XZ	134	171/2	1,500-3,500	60-150	
	MSS-TMZ	135	16, 171/2	1,500-3,500	60-250	GM
	MSS-XE	134	171/2	1,500-3,500	60-150	
	MSS-TMZ	135	16, 171/2	1,500-3,500	60-250	GM

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Steel Tooth Roller Cone Bits						
Tri-Max	TM121	121	6-171/2	1,500-3,000	80-150	
	TM124	124	6-171/2	2,000-4,000	80-150	
	TM125	125	6-171/2	2,000-4,000	80-150	
	TM126	126	6-171/2	2,000-4,000	80-150	B
	TM131	131	6-171/2	2,000-3,000	80-150	
	TM134	134	6-171/2	1,500-4,000	80-150	
	TM135	135	6-171/2	2,000-4,000	80-150	
	TM136	136	6-171/2	2,000-4,000	80-150	
	TM137	137	6-171/2	2,000-5,000	80-150	B
PDC Coring Bits						
Baker Hughes -INTEQ	ARC412	M354	4 3/4-121/4	400-2,000	50-500	Low Inv VGMF
	ARC415	M354	4 3/4-121/4	400-2,500	50-500	Low Inv VGMF
	ARC425	M354	4 3/4-121/4	400-2,500	50-500	Low Inv. F VGMF
	RC412	M354	4 3/4-121/4	400-2,000	50-500	Low Inv F
	RC414	M355	4 3/4-121/4	400-2,000	80-500	Short MF
	RC476	M565	4 3/4-121/4	400-2,300	60-500	Round
Bit-Tech	CP-440-BU	M342	6, 61/8	300-2000	50-500	AFGMVW
	CP-440-BU	M232	77/8, 81/2, 83/4.	300-2000	50-500	AFGMVW
	CP-440	M342	77/8, 81/2, 83/4	300-2000	60-120	AFG
Christensen	ChrisDril		AQ-8	Variable	200-400	AW
Crystal	C60	M232	57/8, 531/32, 6,	100-2,000	60-120	GUI
	C60	M232	77/8, 83/8, 81/2,	100-2,000	60-120	GUI
	C100	M232	57/8, 531/32, 6,	100-2,000	60-120	GUI
	C100	M232	77/8, 83/8, 81/2,	100-2,000	60-120	GUI
DPI	ML31C	M143	61/8-827/32			GI
Kingdream	BC463	M332	43/4,6,81/2,121/4	300-2,500	80-5000	
RockBit	KDC77	S133	43/4-121/4	400-3,350	40-150	UI
	KDC88	S133	43/4-121/4	400-3,350	40-150	Um
Security DBS	CD 93	M233	6-121/4	250-3,500	80-140	F
	FC264LI	M343	81/2-121/4	250-3,500	50-150	F
Varel	C60	M232	57/8, 531/32, 6,	100-2,000	60-120	GUI
	C60	M232	77/8, 83/8, 81/2,	100-2,000	60-120	GUI
	C100	M232	57/8, 531/32, 6,	100-2,000	60-120	GUI
	C100	M232	77/8, 83/8, 81/2,	100-2,000	60-120	GUI
	CS56	M132	81/2 x 4	100-2,000	60-120	GUI
Surface Set Diamond Bits						
Bit-Tech	DN-422	M712	13/4, 17/8, 21/8,	300-3500	60-600	ADGHMNR
	DN-422	M712	41/2,43/4, 6, 61/8,	300-3500	60-600	ADGHMNR
	DG-420F	M622	13/4, 17/8, 21/8,	300-3500	60-600	ADGHIMR
	DG-420F	M622	41/2, 43/4, 6, 61/8,	300-3500	60-600	ADGHIMR
	DN -302	M713	41/2-43/4, 51/2-	300-3500	Variable	Custom
	DN-332	M713	41/2-43/4, 51/2-	300-3500	Variable	Custom
Christensen Products	Natural diamond		13/4-12	Variable	100-275	AW
DPI	NM16	M613	57/8, 61/2, 6 3/4,	250-3,500	60-1,000	MN
Hughes	D262	M713	43/4-121/4	500-3,600	75-500	MR
	D311	M714	43/4-121/4	500-3,600	75-500	R
	T18	M614	43/4-121/4	300-3,000	75-500	NR
Surface Set Diamond Coring Bits						
Baker Hughes-INTEQ	C18	D5X5	43/4-121/4	500-3,000	50-500	Dbl Cone FK
	SC712	T524	43/4-121/4	400-2,000	60-500	Low Inv GMF
Bit-Tech	CG-300	M623	6, 61/8, 61/4, 77/8,	400-2500	50-500	AGIKM
	CN-402	M712	6, 61/8, 61/4, 77/8,	400-2500	50-500	AGKM
	CN-332	M713	61/8, 63/16, 61/4,	400-2500	60-120	AGMR
Christensen Products	Chriset		AQ-8	Variable	200-500	AIW
	Natural diamond		EX-8	Variable	200-700	AF
Security DBS	CB17	M613	6-121/4	250-3,500	80-140	F

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Manufacturer	Bit name/ model number	IADC code	Size range, in.	Recom. WOB, lb/in. of diameter	Recom. rotary speed, rpm	Special features/ usage
Fish Tail Bits						
Bit-Tech	DP-440-BG	M131	61/4	300-2000	100-500	ADGMVW
GeoDiamond	M77	M121	97/8-131/2	500-2,000	60-400	GMNUmVW
	M79	M121	57/8-61/4	400-2,000	60-600	GMNUmVW
	M80	M123	61/2-63/4	400-2,000	60-600	GMNUmVW
	M81	M121	81/2-97/8	400-2,000	60-600	GMNUmVW
	S71	S223	97/8-143/4	500-2,000	60-400	GMNUmVW
	S73	S223	81/2-171/2	500-2,000	60-400	GMNUmVW
	S82	S223	16-171/2	400-2,000	60-600	GMNUmVW
Security DBS	FM2443	M431	61/8, 63/4	500-2,000	60-400	MVW
	FM2445	M121	61/4	500-2,000	60-400	MVW
	FM2445	M331	81/2	500-2,000	60-400	MVW
	FM2445	M131	97/8, 121/4	500-2,000	60-400	MVW
	FM2461	M221	97/8	500-2,000	60-400	MVW
	FM2463	M421	61/8	500-2,000	60-400	MVW

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SECTION 13

SAFETY JOINTS-KNUCKLE JOINTS

	Page
Weatherford Homco™ Super	1 - 2
Weatherford Homco™ Type "B" & "M"	3 - 4
Bowen Knuckle Joint	5

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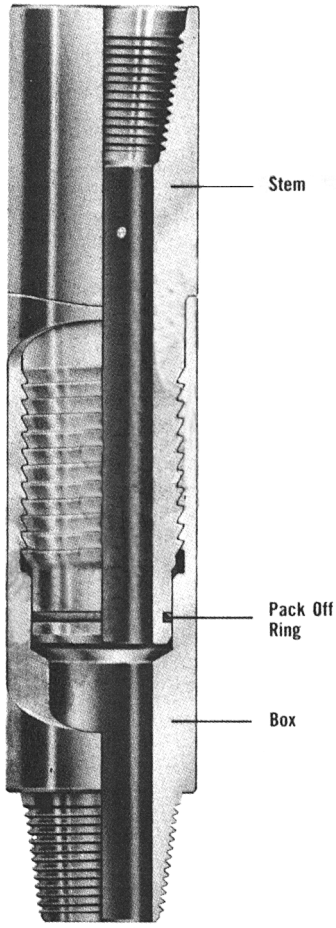
WEATHERFORD
HOMCO
SUPER SAFETY JOINT



Super

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HOMCO SUPER SAFETY JOINT-DRILL PIPE

The patented construction of this joint consists of two sections joined by a buttress type thread and by shoulders on a three-jaw clutch face. The buttress thread is so arranged that the load is carried by the shoulder of the thread instead of the taper when the joint is tightened; therefore, the possibility of swelling the box section under high-load conditions is eliminated. Because the torque is transmitted by the shoulder and the load is transmitted by the buttress threads, this joint will withstand heavy rotational and jarring loads without loosening or overtightening. The Super Safety Joint can be disengaged with approximately fifty percent of the makeup torque; and its design insures easy re-engagement in the hole.

The Super Safety Joint, regardless of size, can easily be screwed together by hand until it shoulders. The clutch type shoulder assures an easy breakout since it is impossible to overtighten the joint if made up correctly. An O-ring packoff, located on the lower end of the pin, provides a leak-proof seal at pressures exceeding 10,000 psi.

If it becomes necessary to disengage the joint in the hole, the weight of the pipe should be neutralized at the joint. Approximately ten rotations will disengage the joint. Neither weight nor tension is necessary to initiate release.

SPECIFICATIONS

Complete Assembly No.	466-101	466-112	466-118	466-115	466-125	466-141	466-133	466-150
O.D. (in.)	1-13/16	2-1/2	3-1/16	3-1/8	3-3/8	3-11/16	3-3/4	3-7/8
I.D. (in.)	5/8	1-1/8	2	1	1-3/4	2.441	1-1/4	2-1/8
O-Ring Packoff. 1 Rqd	150-21-70	150-26-70	151-7-70	151-3-70	151-5-70	151-9-70	150-33-70	151-8-70
Connection (in.)	1-13/16 Homco F.J.	2-3/8 Ext. F. Homco	2-3/8 API E.U.E. 8 RD	2-3/8 API Reg.	2-3/8 API I.F.	2-7/8 API E.U.E. 8 RD	2-7/8 Acme Reg.	2-7/8 I.F. Hydril
Length (in.)	13-3/4	15-1/4	15-1/4	17-1/4	17-1/4	17-1/4	25-1/4	25-1/4
Weight (lbs.)	8	15	15	24	25	23	59	49

Complete Assembly No.	466-155	466-165	466-175	466-170	466-190	466-215	466-210	466-225	466-220
O.D. (in.)	4-1/8	4-1/4	4-1/4	4-5/8	4-3/4	5-1/2	6	6	6-1/4
I.D. (in.)	2-1/8	1-7/8	1-1/2	2-7/16	2-11/16	2-1/4	3	3-1/4	3-1/2
O-Ring Packoff. 1 Rqd	150-37-70	150-37-70	150-36-70	150-40-70	151-14-70	150-42-70	150-47-70	150-48-70	150-51-70
Connection (in.)	2-7/8 API I.F.	3-1/2 Acme Reg.	3-1/2 API Reg.	3-1/2 API F.H.	3-1/2 API I.F.	4-1/2 API Reg.	4-1/2 API F.H.	4-1/2 X-Hole	4-1/2 API I.F.
Length (in.)	25-1/4	24-1/2	24-1/2	24-1/2	24-1/4	29	29	28-1/2	29
Weight (lbs.)	58	66	71	68	67	134	146	131	140

Note: Other sizes are available on request.

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HOMCO SAFETY JOINTS

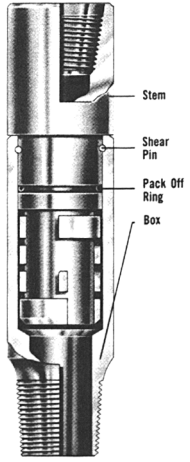
The HOMCO safety joints are special devices designed to provide a positive means of freeing a pipe string at the point of the safety joint's installation. The safety joints can be used in drill strings, fishing and washover operations. They are used with tubing, washpipe and workover strings and may be installed at any desired point in the string.

HOMCO safety joints are manufactured form heat treated steel and are fully parkerized to prevent galling and rusting. They are designed to withstand all the forces encountered during normal operation. Joints can be provided with any type of thread or combination of threads and are available with right-hand or left-hand releases.

TYPE B SHEAR PIN TUBING SAFETY JOINTS

The Type B consists of two sections joined by a J-slot mechanism. When assembled, the two sections are held together by shear pins. These pins carry both load and torque. An O-ring packoff is provided on the pin's member, assuring hydrostatic balance and a leak-proof seal in both the sheared and unsheared position. It is easily released and re-engaged in the hole.

To operate the Type B safety joint, insert pin into box and rotate into the J position and push pin until it shoulders against the box and install two shear pins of the desired shear load (10,000 or 21,000 pounds). To disengage the safety joint, apply sufficient upward force to shear the pins. Apply torque and release weight and then slowly raise the tubing string. The joint will rotate out of the J position and disengage. To re-engage the Type B joint, the string should be lowered until the box section is located. Reverse rotation of the pin section while lowering the string will result in increased torque, indicating that the lug is in the J position.



Type B

SPECIFICATIONS

Complete Assembly No.	466-705	466-710	466-730	466-724
O.D. (in.)	2-1/2	3-1/16	3-11/16	4-1/2
I.D. (in.)	1-19/32	2	2.441	3
O-Ring Packoff. 1 Rqd	767-269	767-264	767-279	767-290
Shear Pins, 2 Rqd				
Load Lbs. 10,000	705-458	705-456	705-456	705-465
21,000		705-524	705-524	705-251
Connection (Box and Pin)	1-1/2 E.U.E.	2 E.U.E.	2-1/2 E.U.E.	3 E.U.E.
Length (in.)	18	18	20	24-1/2
Weight (lbs.)	15	18	28	55

Note: Other sizes are available on request.

(Cont. on pg 13-4)

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TYPE M WASHOVER SAFETY JOINT

(Cont. from pg 13-3)

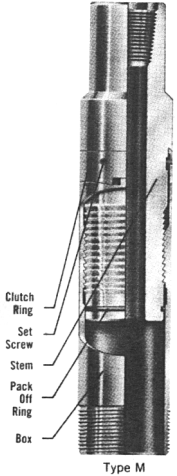
The Type M Washover Safety Joint is designed for operations in strings of washover pipe to permit recovering the run-in string if the washover pipe becomes stuck. The Type M safety joint has an adjustable clutch face on the pin member. Because of the adjustable clutch ring, the Type M joint can be adapted to any box member or any pin member. The clutch ring can easily be replaced if the faces are damaged or worn.

When assembling the Type M washover safety joint, the clutch ring should be slid over the pin member, chamfered end first. The three set screws should be tightened in the ring, and the ring rotated to insure free movement since the screws do not contact the pin member. Next, the joint should be screwed together by hand with the clutch ring being rotated as the joint makes up. When made up correctly, there should be one-half to three-quarters of an inch between the longitudinal surfaces of the clutch ring and the clutch face on the box member. This space provides the necessary movement to release the joint in the hole, if necessary.

SPECIFICATIONS

Complete Assembly No.	466-326	466-390	466-404	466-413	466-409	466-429	466-435
O.D. (in.)	5-5/8	7-3/8	8-1/16	8-1/16	8-11/16	10-1/8	10.832
I.D. (in.)	2-11/16	3-5/32	3-3/4	3	3-5/32	Opt.	3-1/2
O-Ring Packoff. 1 Rqd	767-111	767-210	767-213	767-217	767-222	767-299	767-475
Upper Conn. Box	3-1/2 API I.F.	4-1/2 API F.H.	4-1/2 API F.H.	4-1/2 API F.H.	4-1/2 API F.H.	6-5/8 H-90.	6-5/8 API Reg.
Lower Conn. Pin	5-1/2 FJ-WP	7-3/8 FJ-WP	7-5/8 FJ-WP	8-1/8 FJ-WP	8-5/8 FJ-WP	9-5/8 FJ-WP	10-3/4 FJ-WP
Length (in.)	36-1/2	42-3/8	35	34	36	36-1/16	36-5/8
Weight (lbs.)	121	200	300	325	400	500	590

Note: Other sizes are available on request.



Type M

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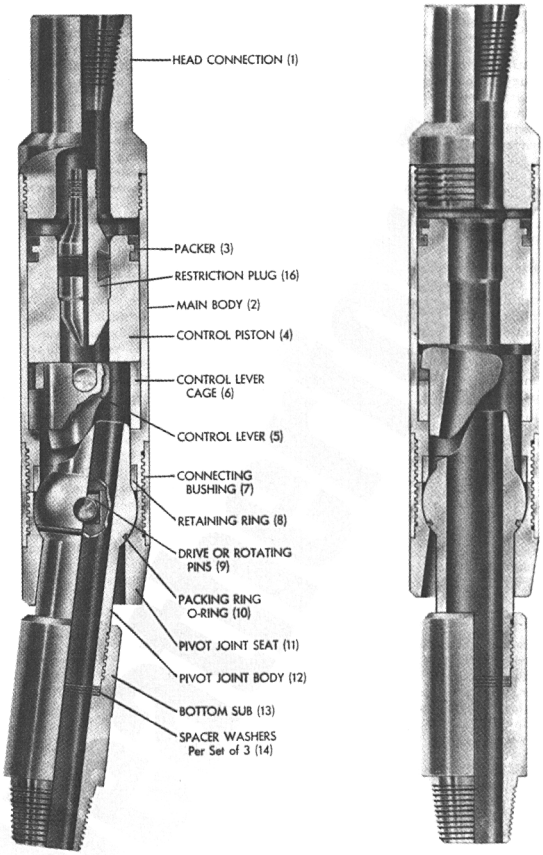
BOWEN KNUCKLE JOINT



Conn.	3-1/2" FH	4-1/2" FH	5-1/2" Reg.
I.D.	1-3/4 "	1-3/4"	1-3/4"
Body O.D.	5-3/4"	6-1/2"	7-1/4"
Tool Joint O.D.	4-3/4"	5-3/4"	6-3/4"
Length Overall	44-1/2"	47-1/2"	47-1/2"
TensileStrength Plus or minus 20%	565,000	637,000	808,000

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SECTION 14
SPEARS AND SPEAR PACK OFF'S

	Page
Bowen Spears	1-18
Weatherford WOBO Connector	19-20
Weatherford Homco Spears	21-23
Spear Pack Off's	25-27
H-E Spears	28
A-Z Spears	29-30
Weatherford McCullough Spears	31-32
Weatherford Differential Packer	33
Weatherford Homco Washover Drill Collar Spear	34
Bowen-Lebus Anchor Washpipe Spear	35-37

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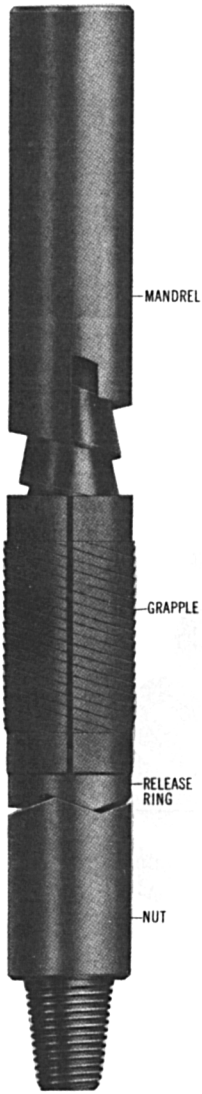
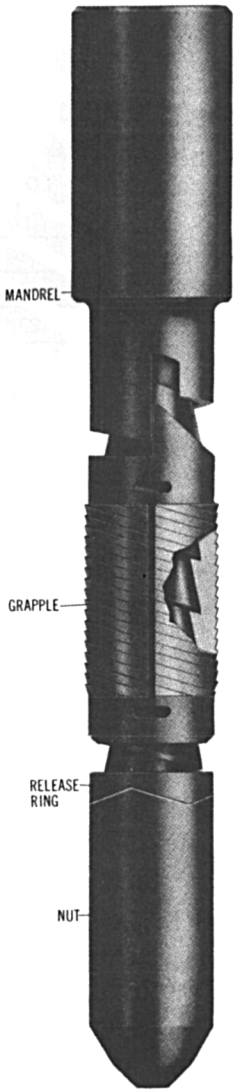
BOWEN RELEASING SPEAR
ITCO TYPE

(Patented)



FLUSH TYPE
IN RELEASING POSITION
(WITH SUB TYPE NUT)



SHOULDER TYPE
IN ENGAGING POSITION

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BOWEN SPEAR

Assembly #16455 Grapple # 16457
Top Conn: 5/8 & 3/4'' S.R. Pin
Mandrel O.D.: 11/16''
Mandrel I.D.: No Bore
Tool Joint O.D.: 11/16 & 1-1/2''
Body Yield Strength: 20,800 Lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal SIze (Grapples were marked with this description)
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	
.725	.742	.750	3/4'' I.D. & 3/4'' Extra Strong Pipe
.799	.813	.824	3/4'' Std. Pipe .824'' I.D.
.850	.864	.875	7/8'' - .864'' I.D. 1'' - 2.25 #C.S. Hydril
.912	.924	.937	.937'' I.D.
.932	.944	.957	1'' Extra Strong Pipe .957'' I.D.
.955	.967	.982	.982'' I.D.
.975	.987	1.000	1'' I.D.
1.033	1.049	1.058	1'' Std. Pipe. 1.049''
1.100	1.112	1.125	1-1/8'' I.D.

BOWEN SPEAR

Ass'y # 19350 Grapple # 19352
Top Conn.: 5/8'' & 3/4'' SR Pin
Mandrel O.D.: 15/16''
Mandrel I.D.: No Bore
Tool Joint O.D.: 15/16'' & 1-5/8''
Body Yield Strength : 29,400 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size (Grapples were marked with this description)
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	
.913	.937	.957	.957'' I.D. - 1'' Extra Strong Pipe
.956	.978	1.000	1.000'' I.D.
1.005	1.027	1.049	1.045'' - 1'' Std. Pipe
1.050	1.072	1.093	1.093'' I.D.
1.081	1.103	1.125	1.125'' I.D.

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BOWEN SPEAR

Ass'y # 11195 Grapple # 11197
Top Conn. - 3/4'' SR Pin
Mandrel O.D - 1-1/8''
Mandrel I.D. - No Bore
Tool Joint O.D. - 1-1/8'' & 1-13/16''
Body Yield Strength - 43,600 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	(Grapples were marked with this description)
1.137	1.170	1.207	1.187'' I.D.
1.180	1.215	1.250	1.250'' - 1.219'' I.D.
1.211	1.246	1.281	1.281'' - 1.250'' I.D.
1.242	1.277	1.312	1.312'' - 1.281'' I.D.
1.273	1.308	1.342	1.343'' - 1.312'' I.D.
1.332	1.367	1.402	1-3/8'' I.D. - 1-1/4'' Tubing
1.394	1.429	1.464	1.438'' I.D.
1.430	1.465	1.500	1.500'' - 1.469'' I.D.
1.580	1.615	1.652	1-1/2'' Std. Pipe & 1-5/8'' I.D.
1.481	1.516	1.551	1.531'' I.D.
1.519	1.554	1.589	1-9/16'' I.D.
1.650	1.687	1.720	1.687'' - 1.700 I.D.
1.722	1.757	1.792	1-3/4'' - 1-25/32'' I.D.
1.771	1.806	1.841	1.815''I.D.
1.836	1.875	1.906	1-7/8''- 1-29/32'' I.D.
1.895	1.930	1.965	1-15/16'' I.D.
1.957	1.992	2.027	2'' I.D.
2.024	2.061	2.094	2.067'' I.D.

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BOWEN SPEAR

Ass'y # 9915 Grapple # 9917
Top Conn.: 1''SR Pin & 2-3/8'' F.J. Box
Mandrel O.D.: 1-3/8''
Mandrel I.D.: No Bore
Tool Joint O.D.: 1-3/8'' & 2-1/2''
Body Yield Strength:

GRAPPLE SIZES

Actual Catching Range			
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	Old Nominal Size (Grapples were marked with this description)
1.441	1.470	1.500	1-1/2'' Extra Strong Pipe (1.500''I.D.)
1.553	1.583	1.610	1-1/2'' Std. Pipe (1.610'' I.D.)
1.566	1.596	1.625	1-5/8'' I.D.
1.598	1.628	1.657	1.657'' I.D.
1.612	1.642	1.670	1.670'' I.D.
1.673	1.700	1.750	1-3/4'' - 1.700'' I.D.
1.707	1.737	1.781	1.781'' I.D.
1.742	1.772	1.800	1.800'' I.D
1.817	1.847	1.875	1-7/8'' I.D.
1.881	1.911	1.939	1.939'' I.D.
1.942	1.972	2.000	2'' I.D.

BOWEN SPEAR

Ass'y # 9645 Grapple # 9647
Top Conn.: 7/8'' SR Pin & 2-3/8'' Reg. Box
Mandrel O.D.: 1-11/16''
Mandrel I.D.: None Except on special order
Tool Joint O.D.: 1-11/16'' & 3-1/8''
Body Yield Strength:
116,400 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	(Grapples were marked with this description)
1.677	1.719	1.750	1.719'' - 1.750'' I.D.
1.742	1.778	1.815	2-3/8'' D.P. - 6.65#
1.802	1.838	1.875	1-7/8'' I.D. & 1-27/32'' I.D.
1.864	1.900	1.937	1.875'' - 1.937'' I.D.
1.968	2.004	2.041	2-3/8'' Tubing 4.0# - 4.7#

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BOWEN SPEAR

Ass'y #1344 Gr. # 1348 / Ass'y # 17228 Gr. # 17230

Top Conn. - 1-3/4'' Homco F.J. & 2-3/8'' F.J. & 2-3/8'' Reg. — Box
Mandrel O.D. - 1-7/8''
Mandrel I.D. - 3/8''
Tool Joint O.D. 1-7/8'' & 2-3/8'' & 3-1/8''
Body Yield Strength - 132,000 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size (Grapples were marked with this description)
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	
1.788	1.828	1.867	1.867'' I.D. (Turn Body Down)
1.796	1.836	1.876	1.875'' I.D. (Turn Body Down)
1.889	1.929	1.968	1.937'' - 1.968'' I.D.
1.952	1.992	2.041	2-3/8'' Tubing - 4# - 4.70#
1.983	2.023	2.062	2.000'' - 2.062'' I.D.
2.045	2.085	2.125	2-1/8'' I.D.
2.091	2.131	2.172	2-7/8'' D.P. 9.75 - 10.4 #
2.170	2.211	2.250	2-1/4'' - 2-3/16'' I.D.
2.186	2.226	2.266	2-17/64'' I.D.
2.233	2.273	2.312	2-5/16'' I.D.
2.249	2.289	2.329	2-7/8'' O.D. D.P. 7.80#-8.35#
2.295	2.335	2.375	2-3/8'' I.D. NX 1/2 Drill Rod
2.358	2.398	2.438	2-3/8'' I.D. & 2-7/16'' I.D.
2.390	2.430	2.469	2-7/8'' Tbg. 6.25 to 6.5, 2-7/8" O.D. 6.45# BX
2.420	2.460	2.500	2-7/16'' I.D. & 2-1/2'' I.D.
2.556	2.596	2.625	2-5/8'' I.D. & 2-9/16'' I.D.
2.608	2.648	2.688	2-5/8'' I.D. & 2-11/16 I.D.
2.670	2.710	2.750	2-3/4" I.D.
2.921	2.961	3.000	3'' I.D. & 2-15/16'' I.D. NX Drive Csg.
3.046	3.086	3.126	3-1/16'' I.D. & 3-1/8'' I.D.
3.170	3.210	3.250	3-1/4'' I.D. & 3-3/16'' I.D.
3.264	3.304	3.344	3-11/32'' I.D. & 3-9/32'' I.D.

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BOWEN SPEAR

Ass'y # 1227 Gr. # 1230 / Ass'y # 17231 Gr. # 17233

Top Conn.: 2-3/8'' Wilson F.J. & 2-7/8'' Reg. Box
Mandrel O.D.: 2-5/16''
Mandrel I.D.: 3/8''
Tool Joint O.D.: 2-5/16'' & 3-3/4''
Body Yield Strength:

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size (Grapples were marked with this description)
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	
2.280	2.328	2.375	2-3/8 I.D.
2.351	2.399	2.446	2-3/8'' I.D. - 2-7/16'' I.D.
2.390	2.438	2.487	2-7/8'' Tbg 6.25 - 6.5# 2-7/8'' D.P. 6.45#
2.468	2.516	2.563	2.562'' - 2-15/32'' I.D.
2.515	2.562	2.610	3-1/2'' O.D. 15.5# D.P.
2.593	2.641	2.688	2-11/16'' - 2-5/8'' I.D.
2.671	2.718	2.766	3-1/2'' O.D. 13.3 - 12.4# D.P.
2.700	2.748	2.813	2-13/16'' I.D. & 2-3/4'' I.D.
2.827	2.875	2.922	3-1/2'' O.D. 10.2 - 11.2# D.P.
2.843	2.891	2.938	2-7/8'' - 2-15/16'' I.D.
2.890	2.938	2.992	3-1/2'' O.D. 9.20# - 10.20# D.P.
2.984	3.032	3.079	3-1/2'' O.D. 7.70# Tubing to 8.5# D.P.
3.030	3.078	3.125	3-1/8'' - 3-1/16'' I.D.
3.155	3.203	3.250	3-1/4'' - 3-3/16'' I.D.
3.297	3.345	3.392	3.340'' - 3.382'' I.D. 4'' O.D. 12.50 - 15# D.P
3.437	3.485	3.532	3-1/2'' I.D.

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BOWEN SPEAR

Assembly # 9410 Grapple # 9412
Top Conn: 2-7/8'' Reg. Box
Mandrel O.D.: 2-13/16''
Mandrel I.D.: 1/2''
Tool Joint O.D.: 2-13/16'' & 3-3/4"
Body Yield Strength: 357,000 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size (Grapples were marked with this description)
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	
2.532	2.579	2.625	3-1/2'' O.D. D.P. 15.50#
2.671	2.718	2.764	3-1/2'' O.D. D.P. 13.30 - 12.40#
2.829	2.875	2.922	3-1/2'' O.D. D.P. 11.20 - 10.20#
2.985	3.032	3.078	2-1/2'' O.D. D.P. 8.50#
2.881	2.933	2.992	3-1/2'' O.D. 9.20 - 10.20#
2.949	3.001	3.068	3-1/2'' O.D. 7.70 - 9.20#
3.021	3.073	3.125	3-1/8'' I.D.
3.146	3.198	3.250	3-1/4'' - 3-3/16'' I.D.
3.256	3.308	3.364	4'' O.D. 12.50 - 14.00 # D.P.
3.365	3.417	3.476	4'' O.D. 11.00 - 11.60 #
3.444	3.496	3.548	4'' O.D. 9.50 - 11.00 #
3.522	3.574	3.625	3.500'' 3.625'' I.D.
3.584	3.636	3.687	3-11/16'' I.D.
3.646	3.698	3.750	3-3/4'' I.D.

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BOWEN SPEAR

Assembly # 9485 Grapple # 9487 / Assembly # 530 Grapple # 532

Top Conn: 2-7/8'' Reg. Box
Mandrel O.D.: 3-1/4''
Mandrel I.D.: 3/4''
Tool Joint O.D.: 3-1/4'' & 4-1/8''
Body Yield Strength:
530,00 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	(Grapples were marked with this description)
3.218**	3.291	3.364	4'' O.D. 12.50 - 14.00 # Tubing
3.327	3.400	3.476	4'' O.D. 11.00 - 11.60 # Tubing
3.406	3.479	3.548	4'' O.D. 9.50 - 11.00 # Tubing
3.484	3.557	3.625	3-5/8'' I.D. & 3-9/16'' I.D.
3.608	3.681	3.754	4-1/2'' O.D. 18.10 - 22 # Tubing
3.671	3.744	3.826	4-1/2'' O.D. 15.35 - 18.10 # Tubing
3.812	3.885	3.958	4-1/2'' O.D. 13.75 - 15.35 # Tubing
3.874	3.947	4.026	4-1/2'' O.D. 11.00 - 13.75 # Tubing
3.937	4.010	4.090	4-1/2'' O.D. 9.50 - 11.60 # Tubing
4.134	4.207	4.276	5'' O.D. 18 - 21 # Tubing
4.155	4.228	4.300	5'' O.D. 17.70 - 18.00 # Tubing
4.358	4.431	4.506	5'' Tubing 12.04 - 15 # (4.408) I.D.
4.406	4.479	4.560	5'' O.D. 11.5 # Tubing
4.874	4.947	5.012	5-1/2'' 14 - 17 # Tubing

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BOWEN SPEAR

Assembly # 17475 Grapple # 17477 / Assembly # 13200 Grapple # 13202

Top Conn: 2-7/8'' Reg. Box
Mandrel O.D.: 3-5/8''
Mandrel I.D.: 3/4''
Tool Joint O.D.: 3-3/4" & 4-1/2''
Body Yield Strength: 725,000 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size (Grapples were marked with this description)
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	
3.682	3.782	3.881	4-1/2'' O.D. Tubing 15.35 - 18.10 #
3.761	3.861	3.958	4-1/2'' O.D. Tubing 13.75 - 15.35 #
3.823	3.923	4.026	4-1/2'' O.D. Tubing 11.00 - 13.75 #
3.886	3.986	4.090	4-1/2'' O.D. 9.50 - 11.60 # Csg.
4.073	4.173	4.276	5'' O.D. 18.00 - 21.00 # Csg.
4.214	4.314	4.408	5'' O.D. 15.00 - 18.00 # Csg.
4.307	4.407	4.506	5'' O.D. 12.64 - 15.00 # Csg.

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BOWEN SPEAR

Assembly # 1332 Grapple # 1334 / Assembly # 9680 Grapple # 9682

Top Conn.: 2-7/8'' Reg. Box
Mandrel O.D.: 4-1/32''
Tool Joint O.D.: 4-1/32" & 4-3/8''
Mandrel I.D.: 7/8''
Body Yield Strength: 922,000 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size (Grapples were marked with this description)
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	
4.093	4.179	4.276	5'' O.D. 18 - 21 # Csg.
4.234	4.320	4.408	5'' O.D. 15 - 18 # Csg.
4.390	4.476	4.562	5'' O.D. 11.5 - 15 # Csg.
4.469	4.555	4.642	5'' O.D. 9 - 13 # Csg.
4.515	4.601	4.696	5'' O.D. 8 # 5-1/2'' O.D. 23 - 25 # Csg.
4.609	4.695	4.782	5-1/2'' O.D. 20 - 23 # Csg.
4.719	4.805	4.892	5-1/2'' O.D. 17 - 20 # Csg.
4.875	4.961	5.048	5-1/2'' O.D. 14 - 17 # Csg.
4.922	5.008	5.095	5-3/4'' O.D. 19.5 - 22.5 # Csg.
5.015	5.101	5.192	5-3/4'' O.D. 17-19.5 # Csg. 5-1/2'' 9-13 # Csg.
5.124	5.210	5.297	5-3/4'' O.D. 14 - 17 # Csg.
5.218	5.304	5.390	6'' O.D. 20 - 23 # Csg.
5.281	5.367	5.454	6'' O.D. 17 - 20 # Csg.
5.375	5.461	5.552	6'' O.D. 14 - 17 # Csg.

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BOWEN SPEAR

Assembly # 9715 Grapple # 9717 / Assembly # 17234 Grapple # 17236

Top Conn.: 3-1/2'' F.H. Box
Mandrel O.D.: 5''
Mandrel I.D.: 1''
Tool Joint O.D.: 5''
Body Yield Strength : 1,175,000 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size (Grapples were marked with this description)
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	
5.500	5.586	5.675	6-5/8'' O.D. 32 - 34 # Csg.
5.000	5.134	5.266	6'' O.D. 23 - 26 # Csg.
5.093	5.227	5.360	6'' O.D. 20 - 23 # Csg.
5.187	5.321	5.454	6'' O.D. 17 - 20 # Csg
5.280	5.414	5.547	6'' O.D. 14 - 17 # Csg.
5.406	5.540	5.675	6'' O.D. 10.5 - 14 # Csg.
5.530	5.664	5.797	6-5/8'' O.D. 28 - 32 # Csg.
5.593	5.727	5.860	6-5/8'' O.D. 26 - 29 # Csg.
5.656	5.790	5.923	6-5/8'' O.D. 24 - 28 # Csg.
5.671	5.805	5.938	7'' O.D. 38 - 40 # Csg.
5.781	5.915	6.049	6-5/8 '' O.D. 20 - 24 # Csg.
5.790	5.930	6.063	7'' O.D. 33.7 - 38 # Csg.
5.875	6.009	6.142	6-5/8'' O.D. 17 - 22 # Csg.
5.937	6.071	6.204	7'' O.D. 29 - 33.7 # Csg.
6.015	6.149	6.282	7'' O.D. 26 - 29 # Csg.
6.140	6.274	6.407	7'' O.D. 22 - 26 # Csg.
6.202	6.335	6.469	7'' O.D. 20 - 23 # Csg.
6.281	6.415	6.548	7'' O.D. 17 - 20 # Csg.

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BOWEN SPEAR

Assembly # 9266 Grapple # 9268 / Assembly # 17237 / Grapple # 17239

Top Conn.: 4-1/2'' F.H. Box
Mandrel O.D.: 5-11/16''
Tool Joint O.D.: 5-11/16" & 7''
Mandrel I.D.: 2''
Body Yield Strength: 907,100 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size (Grapples were marked with this description)
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	
5.770	5.970	6.173	7'' O.D. 30 - 40 # 6-5/8'' O.D. 24 # Csg.
5.895	6.095	6.297	7'' O.D. 26 - 35 # Csg.
6.020	6.220	6.423	7'' O.D. 22 - 33.7# Csg.
6.270	6.470	6.673	7'' O.D. 13 - 24 # Csg.
6.364	6.564	6.765	7-5/8'' O.D. 33.7 - 45 # Csg.
6.567	6.767	6.969	7-5/8'' O.D. 26.4 - 39 # Csg.
6.864	7.064	7.263	7-5/8'' O.D. 14.75 - 26.4 # Csg.
6.987	7.187	7.391	8-1/8'' O.D. 32 - 42 # Csg.
7.225	7.425	7.628	8'' O.D. 16 - 26 # Csg.
7.239	7.439	7.642	7-9/16'' I.D. Csg
7.489	7.689	7.892	8-5/8'' O.D. 36 - 48 # Csg.
7.755	7.955	8.157	8-5/8'' O.D. 24 - 38 # Csg. 9'' O.D. 40 - 55 # Csg
7.911	8.111	8.313	8-5/8'' O.D. 17.6 - 29.35 # Csg.
7.958	8.158	8.360	9'' O.D. 34 - 45 # Csg.
8.442	8.642	8.884	9-5/8'' O.D. 43.5 - 53.5 # Csg.
8.692	8.892	9.094	9-5/8'' O.D. 29.3 - 42 # Csg.

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BOWEN SPEAR

Assembly # 9572 Grapple # 9574
Top Conn: 4-1/2'' F.H. Box
Mandrel O.D.: 6-15/16''
Mandrel I.D.: 2''
Tool Joint O.D.: 6-15/16 & 8''
Body Yield Strength: 1,800,000 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size (Grapples were marked with this description)
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	
7.102	7.245	7.385	8'' O.D. 26 # & 8-1/8'' O.D. 32 - 42 # Csg.
6.352	7.495	7.635	8'' O.D. 16 - 26 # & 8-1/8'' O.D. 28 - 32.20 # Csg.
7.537	7.686	7.825	8-5/8'' O.D. 36 - 48 # Csg.
7.759	7.902	8.042	8-5/8'' O.D. 28 - 38 # & 9'' O.D. 45 - 55 # Csg.
7.981	8.125	8.290	8-5/8'' O.D. 17.5 - 29.35 # & 9'' O.D. 34 - 45 # Csg.
8.435	8.578	8.760	9'' O.D. 19 # & 9-5/8'' O.D. 43.5 - 58 # Csg.
8.790	8.833	9.073	9-5/8'' O.D. 29.3 - 42 # Csg.

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BOWEN SPEAR

Assembly # 17243 Grapple # 17245 / Assembly # 9380 Grapple # 9382

Top Conn.: 5-1/2'' Reg. Box
Mandrel O.D.: 7-1/4''
Mandrel I.D.: 2-3/4''
Tool Joint O.D.: 7-1/4" & 8-5/8''
Body Yield Strength: 1,946,000 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size (Grapples were marked with this description)
Minimum I.D.	Nominal * Catch Size	Maximum I.D.	
7.537	7.690	7.846	8-5/8'' O.D. 36 - 48 # Csg.
7.729	7.882	8.034	8-5/8'' O.D. 28 - 38 # & 9'' O.D. 45 - 55 # Csg.
7.981	8.134	8.315	8-5/8'' O.D. 17.5 - 29.35 # & 9'' O.D 34-45 #Csg.
8.435	8.588	8.755	9'' O.D. 19 # & 9-5/8'' O.D. 43.5 - 58 # Csg.
8.535	8.688	8.846	9-5/8 O.D.'' 40 - 53.5 # Csg.
8.760	8.913	9.065	9-5/8 O.D.'' 29.3 - 42 # Csg.
9.479	9.632	9.784	10-3/4'' O.D. 55.5 - 65.7 # Csg.
9.760	9.913	10.065	10-3/4'' O.D. 40 - 55.5 # Csg.
9.885	10.038	10.192	10-3/4'' O.D. 32.75 - 48.0 # Csg.
10.729	10.882	11.034	11-3/4'' O.D. 47 - 60 # Csg.
10.854	11.007	11.159	11-3/4'' O.D. 38 - 54 # Csg.
12.228	12.381	12.534	13-3/8'' O.D. 61 - 85 # Csg.
12.415	12.568	12.721	13-3/8'' O.D. 48 - 68 # Csg.

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BOWEN SPEAR

Assembly # 9281 Grapple # 9283
Top Conn.: 5-1/2'' Reg Box
Mandrel O.D.: 8-1/4''
Tool Joint O.D.: 8-1/4" & 9-5/8''
Mandrel I.D.: 2-3/4''
Body Yield Strength : 2,700,000 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size (Grapples were marked with this description)
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	
8.435	8.597	8.755	9-5/8'' O.D. 43.5 - 58 # Csg.
8.519	8.681	8.844	9-5/8'' O.D. 40 - 53.5 # Csg.
8.596	8.758	8.921	9-5/8'' O.D. 36 - 43.5 # Csg.
8.738	8.900	9.063	9-5/8'' O.D. 29.3 - 42 # Csg.
9.738	9.900	10.063	10-3/4'' O.D. 40 - 55.5 # Csg.
9.867	10.029	10.192	10-3/4'' O.D.32.75 - 48 # Csg.
9.225	9.387	9.550	10-3/4'' O.D. 71 - 76 # Csg.
11.206	11.369	11.531	11.500'' I.D. Csg.
10.581	10.743	10.906	11-3/4'' O.D. 54 - 65 # Csg.
10.832	10.994	11.157	11-3/4'' O.D. 38 - 54 # Csg.
10.612	10.774	10.937	11-3/4'' O.D. 60 # Csg.
10.675	10.837	11.000	11-3/4'' O.D. 47 - 60 # Csg.
11.643	10.805	11.968	13-3/8'' O.D. & 11.937''I.D. Csg.
11.674	11.837	12.000	13-3/8'' O.D. 96 # & 11.975'' I.D. Csg.
12.022	12.184	12.347	13-3/8'' O.D. 72 - 85 # Csg.
12.393	12.555	12.718	13-3/8'' O.D. 48 - 68 # Csg.
12.455	12.617	12.780	12-3/4'' I.D. Csg.
13.143	12.305	13.468	14'' O.D. 42 - 57 # Csg.
13.312	12.474	13.637	13.599'' I.D. & 13.609'' I.D. Csg.
13.330	12.492	13.655	13-5/8'' I.D. Csg.
15.112	15.274	15.437	16'' O.D. 55 - 75 # Csg.
14.925	15.087	15.250	16'' O.D. 65 - 84 # Csg.
17.331	17.493	17.656	17-1/2'' I.D. Csg.
18.862	19.024	19.187	20'' O.D. 90 - 106.5 # Csg.

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BOWEN SPEAR

Assembly # 17246 Grapple # 17248
Top Conn.: 5-1/2 Reg. Box
Mandrel O.D.: 8-1/4''
Mandrel I.D.: 2-3/4''
Tool Joint O.D.: 8-1/4" & 9-5/8''
Body Yield Strength: 2,700,000 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size (Grapples were marked with this description)
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	
8.435	8.597	8.755	9-5/8'' O.D. 43.5 - 58 # Csg.
8.519	8.681	8.844	9-5/8'' O.D. 40 - 53.5 # Csg.
8.596	8.758	8.921	9-5/8'' O.D. 36 - 43.5 # Csg.
8.738	8.900	9.063	9-5/8'' O.D. 29.3 - 42 # Csg.
9.225	9.387	9.550	10-3/4'' O.D. 71 - 76 # Csg.
9.470	9.632	9.794	10-3/4" O.D. 54 - 65.7# Csg.
9.738	9.900	10.063	10-3/4'' O.D. 40 - 55.5 # Csg.
9.867	10.029	10.192	10-3/4'' O.D. 32.75 - 48 # Csg.
11.206	11.369	11.531	11.500'' I.D. Csg.
10.581	10.743	10.906	11-3/4'' O.D. 54 - 65 # Csg.
10.832	10.994	11.157	11-3/4'' O.D. 38 - 54 # Csg.
10.612	10.774	10.937	11-3/4'' O.D. 60 # Csg.
10.675	10.837	11.000	11-3/4'' O.D.47 - 60 # Csg.
11.643	10.805	11.968	13-3/8'' O.D. 11.937'' I.D. Csg.
11.674	11.837	12.000	13-3/8'' O.D. 96 # & 11.975'' I.D. Csg.
12.022	12.184	12.347	13-3/8'' O.D. 72 - 85 # Csg.
12.393	12.555	12.718	13-3/8'' O.D. 48 - 68 # Csg.
12.445	12.617	12.780	12-3/4 I.D. Csg.
13.143	13.305	13.468	14'' O.D. 42 - 57 # Csg.
13.312	13.474	13.637	13.599'' I.D. & 13.609'' I.D. Csg.
13.330	13.492	13.655	13-5/8 I.D. Csg.
15.112	15.274	15.437	16'' O.D. 55 - 75 # Csg.
14.925	15.087	15.250	16'' O.D. 65 - 84 # Csg.
17.331	17.493	17.656	17-1/2'' I.D. Csg.
18.862	19.024	19.187	20'' O.D. 90 - 106.5 # Csg.
18.595	18.757	18.919	20'' - 131# Csg.
18.425	18.587	18.749	20'' - 133# Csg.

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BOWEN SPEAR

Assembly # 27780 Grapple # 27782
Mandrel O.D.: 11-3/4''
Mandrel I.D.: 3-1/2''
Tool Joint O.D.: 11-3/4" & 13-3/8''
Body Yield Strength: 5,600,000 lbs.

GRAPPLE SIZES

Actual Catching Range			Old Nominal Size (Grapples were marked with this description)
Minimum I.D.	Nominal* Catch Size	Maximum I.D.	
12.097	12.259	12.422	13-3/8'' O.D. 68 - 85 # Csg.
12.390	12.552	12.715	13-3/8'' O.D. 48 - 61 # Csg.

SEGMENT TYPE GRAPPLE ASSEMBLY

Fits Spear Number	9380	9380	9380	9380	17243	17243	17243	17243	20895
To Catch - Pipe Size	10-3/4	11-3/4	12-3/4	13-3/8	10-3/4	11-3/4	12-3/4	13-3/8	13-3/8
- Pipe Wt.	32.75	38.00	45.45	48.00	32.75	38.00	45.45	48.60	48.60
	48.00	54.00	66.72	68.00	48.00	54.00	66.72	68.00	68.00
	40.00	47.00	-	61.00	40.00	47.00	-	61.00	61.00
	55.50	60.00	-	85.00	55.50	60.00	-	85.00	85.00
Complete Assembly Part No.	9382	9382	9382	9382	17245	17245	17245	17245	20897
Weight	178	189	198	197	337	350	359	382	401
Fits Spear Number	9281	9281	9281	9281	17246	17246	17246	17246	27780
To Catch - Pipe Size	13-3/8	14	16	20	13-3/8	14	16	20	20
- Pipe Wt.	48.00	42.00	55.00	90.00	48.00	42.00	55.00	90.00	90.00
	68.00	57.00	65.00	94.00	68.00	57.00	65.00	94.00	94.00
	61.00	-	-	106.00	61.00	-	-	133.00	133.00
	85.00	-	-	133.00	85.00	-	-	-	-
Complete Assembly Part No.	9283	9283	9283	9283	17248	17248	17248	17248	27782
Weight	197	207	216	536	392	412	430	720	800

* Grapples are marked with this size.

** Mandrel is 3-1-/4'' O.D.

The strengths shown are theoretical calculations based on yield strength of the material used in each case. The strengths shown are therefore accurate, plus or minus 20% of the figures shown only.

These figures do not constitute a guarantee actual or implied, they are meant to serve as a guide only and appropriate allowance must be made in use, as a safety factor.

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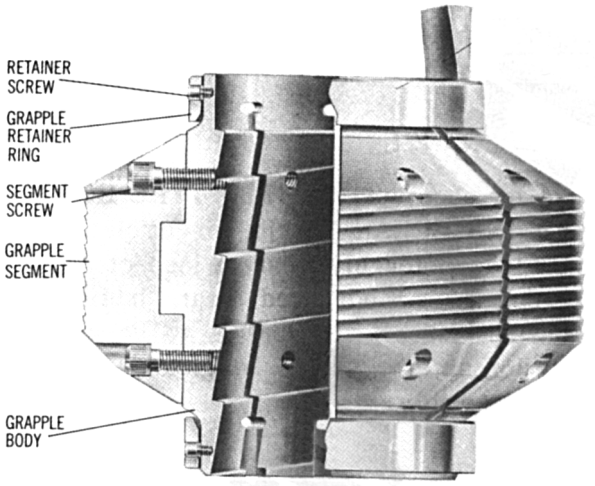

SEGMENT-TYPE SPEAR GRAPPLE ASSEMBLY
FOR 8-5/8 CASING SPEAR, SYMBOL NO. 9380

The **Bowen Segment Type Spear Grapple** is used in place of the standard one-piece Grapple on 8-5/8'' catch to 13-3/8'' and 9-5/8'' Spears to enable them to engage casing up to 20''. This Grapple consists of a Grapple Body, eight Grapple Segments, two Retainer Rings, six Ring Screws, six Ring Spacers, and Grapple Segment Screws. The helix of the Grapple Body matches that of the Spear Mandrel, thereby making the action of the Spear the same as with a Standard Grapple.

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WEATHERFORD WOBO™
WASHOVER BACK-OFF CONNECTOR

Application

The washover back-off connector is used in conjunction with washover assemblies, enabling the operator to wash over, back-off and retrieve a fish (or parts thereof) in one roundtrip.

Construction

The tool consists of an outer and an inner assembly which can rotate independently of each other. The former consists principally of a top sub, a housing with two sets of clutch fingers, and a washover safety joint. The latter consists of a fishing stem piston with matching clutch fingers, a fishing stem, a drain sub and a jay-type safety joint. The two assemblies have also some limited freedom of axial movement; in compressed position one set of clutch fingers interact- the overriding clutch-, and in extended position the other clutch fingers engage-the positive clutch. In between, the assemblies rotate freely relative to each other.

Operation

The washover pipe is made up and supported in the rotary table. The assembled washover back-off connector is slipped into the upper joint, the washover safety joint being made up to the washover pipe. The running string is made up to the top sub and the entire assembly run in the hole.

The assembly is lowered until the washover shoe is just above the fish. Then the kelly is attached to the string and the washover operation commenced.

This is carried out as normal until the jay-type safety joint contacts the top of fish. There is no danger of applying excessive torque since the tool incorporates the overriding clutch. Apply slight weight, causing the overriding clutch to engage and screw into the fish. Then raise the string carefully to engage the positive clutch and apply right hand torque to tighten the connection as well as all other connections in the string.

If a string shot cannot be run through the swivel and kelly, strain should be pulled on the string to shear the pins in the jay-type safety joint and the joint released by turning to the left. The string can then be raised, the kelly replaced by drill pipe and then lowered again to reengage the safety joint. Check the engagement by pulling strain on the pipe. By letting down again the tool can be placed in its free working position so that the washover pipe and running string can be rotated until the string shot is ready to be run in the hole, thus minimizing the danger of sticking the pipe. Rotation is stopped and a string shot is lowered in the hole together with a free point indicator. After having determined the free point, the string shot is positioned opposite a connection a couple of joints higher. Then the fishing string is elevated to engage the positive clutch, left hand torque applied and worked down the string, and the string shot fired.

When coming out of the hole the top joint of washover pipe should be suspended in the rotary table and the washover back-off connector broken out at the washover pipe thread of the safety joint.

Then the string can be elevated, the jay-type safety joint released and the fish stripped out in conventional manner. The above procedure is repeated until the entire fish has been brought out of the hole.

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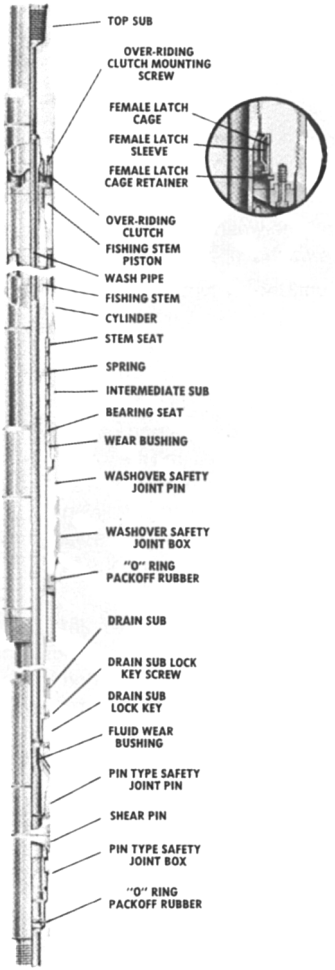
WOBO™ WASHOVER BACK-OFF CONNECTOR

O.D. In.	I.D. In.	Top Box Connection	Bottom Pin Connection	Washover Pipe Pin Connection	Assembly Part Number
4''	1-5/8	2-3/8 API I.F.	2-3/8 EUE 8 RD.	4'', 14# HYD FJWP	352-505
5-3/8	1-5/8	2-7/8 API I.F.	2-7/8 API I.F.	5-1/2, 17# HYD FJ	352-510
7-5/16	2''	4-1/2 API F.H.	4-1/2 API F.H.	7-5/8 X-LINE	352-515



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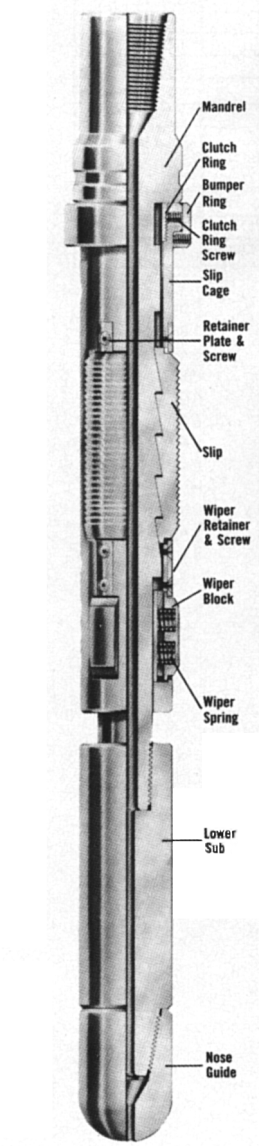
WEATHERFORD / HOMCO SPEAR



Type T Three-Slip Circulating and Releasing Spear

Identification	RSI
Type	C & R
No. of slips	3
Top Conn.	2-3/8'' F.J.
Lower Conn.	1-13/16'' F.J.
Cage O.D.	1-7/8''
Cage I.D.	1-3/8''
Mandrel:	
Largest O.D.	1-1/4''
Smallest O.D.	7/8''
Mandrel I.D.	0
Bump Ring O.D.	2-1/2''
Max. Work Load	63,000#

Will Catch

2-3/8'' EUE Tubing 1.995''

Identification	S-2
Type	S
No. of slips	6
Top Conn.	2-7/8'' Acme
Lower Conn.	1-13/16'' F.J.
Cage O.D.	2-1/4''
Cage I.D.	1-3/4''
Mandrel:	-
Largest O.D.	1-5/8''
Smallest O.D.	1-1/4''
Mandrel I.D.	0
Bump Ring O.D.	3-3/4''
Max. Work Load	143,400 #

Will Catch

2-7/8'' E.U.E. Tubing 2.441''

Identification	RS-2B
Type	C & R
No. of slips	3
Top Conn.	2-3/8'' F.J.
Lower Conn.	None
Cage O.D.	2-1/4''
Cage I.D.	1-13/16''
Mandrel:	-
Largest O.D.	1-3/4''
Smallest O.D.	1-5/16''
Mandrel I.D.	3/8''
Bump Ring O.D.	2-3/4''
Max. Work Load	131,000 #

Will Catch

3-1/4''	3.250
2-7/8''	2.875
2-11/16''	2.6875

Identification	S-3
Type	S
No. of slips	6
Top Conn.	2-3/8'' I.F.
Lower Conn.	2-3/8'' F.J.
Cage O.D.	2-5/8''
Cage I.D.	2-1/8''
Mandrel:	-
Largest O.D.	2-1/16''
Smallest O.D.	1-1/2''
Mandrel I.D.	0
Bump Ring O.D.	3-3/8''
Max. Work Load	186,500 #

Will Catch

4'' 11.60	
3-1/2'' 13.30	2.764
3-1/2'' 10.20	

Identification	RS4
Type	C & R
No. of slips	3
Top Conn.	2-7/8'' Acme
Lower Conn.	2-3/8'' F.J.
Cage O.D.	3-1/4''
Cage I.D.	2-1/2''
Mandrel:	-
Largest O.D.	2-1/2''
Smallest O.D.	2''
Mandrel I.D.	5/8''
Bump Ring O.D.	3-7/8''
Max. Work Load	300,000 #

Will Catch

4'' 11.60 #	3.428
4-1/2'' 12.75 #	
4-1/2'' 16.60 #	
4-3/4'' 16	4.082

Identification	S-6
Type	S
No. of slips	6
Top Conn.	3-1/2'' Acme
Lower Conn.	2-7/8'' Acme
Cage O.D.	4-1/16''
Cage I.D.	3-11/16''
Mandrel:	-
Largest O.D.	3''
Smallest O.D.	2-3/8''
Mandrel I.D.	3/4''
Bump Ring O.D.	4-7/8''
Max. Work Load	417,000 #

Will Catch

5'' 15 #	4.408''
5'' 15-18 #	4.408'' to 4.276''
5'' 18#	4.276''
5-1/2'' 14-15 #	5.012'' to 4.974''
5-1/2'' 17-20 #	4.892'' to 4.778''
6'' 17-20 #	5.462'' to 5.352''

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WEATHERFORD / HOMCO SPEAR

Identification	RS-6
Type	C & R
No. of slips	3
Top Conn.	3-1/2'' Acme
Lower Conn.	2-7/8'' Acme
Cage O.D.	4-1/16''
Cage I.D.	3-1/4'''
Mandrel:	-
Largest O.D.	3''
Smallest O.D.	2-1/2''
Mandrel I.D.	3/4''
Bump Ring O.D.	4-7/8''
Max. Work Load	417,000 #

Will Catch

5'' 18 #	4.276
5-1/2'' 14-15 #	5.012 to 4.950
5-1/2'' 17-20 #	4.892 to 4.778
6'' 17-20 #	5.462 to 5.352
6-3/8'' 24 #	5.625

Identification	RS8
Type	C & R
No. of slips	3
Top Conn.	4-1/2'' F.H.
Lower Conn.	3-1/2'' Acme
Cage O.D.	5-5/8''
Cage I.D.	4-1/2''
Mandrel:	-
Largest O.D.	4-7/16''
Smallest O.D.	3-5/8''
Mandrel I.D.	1-1/4''
Bump Ring O.D.	6-1/2''
Max. Work Load	798,000 #

Will Catch

6-5/8'' 20-24 #	6.049 to 5.921
6-5/8'' 26-28 #	5.855 to 5.791
7'' 20-22 #	6.456 to 6.398
7'' 24-26 #	6.336 to 6.276
7'' 26-28 #	6.276 to 6.214
7'' 28-30 #	6.214 to 6.154
7'' 32-38 #	6.094 to 5.920
7-5/8'' 26-33 #	6.969 to 6.765
7-5/8'' 33-39 #	6.765 to 6.625
8-1/8'' 39-50 #	7.185
8-5/8'' 26-28 #	8.057 to 8.017
8-5/8'' 38-43 #	7.775 to 7.625

Identification	RS-10
Type	C & R
No. of slips	3
Top Conn.	4-1/2'' F.H.
Lower Conn.	4-1/2'' F.H.
Cage O.D.	8-3/8''
Cage I.D.	7-1/4''
Mandrel:	-
Largest O.D.	7-1/8''
Smallest O.D.	6''
Mandrel I.D.	4''
Bump Ring O.D.	9-1/2''
Max. Work Load	792,000 #

Will Catch

9-5/8'' 29-36 #	9.063 to 8.921
9-5/8'' 54 #	8.535
10-3/4'' 32-75 #	10.192
10-3/4'' 40-55 #	10.054 to 9.760
13-3/8'' 48-61 #	12.715 to 12.515

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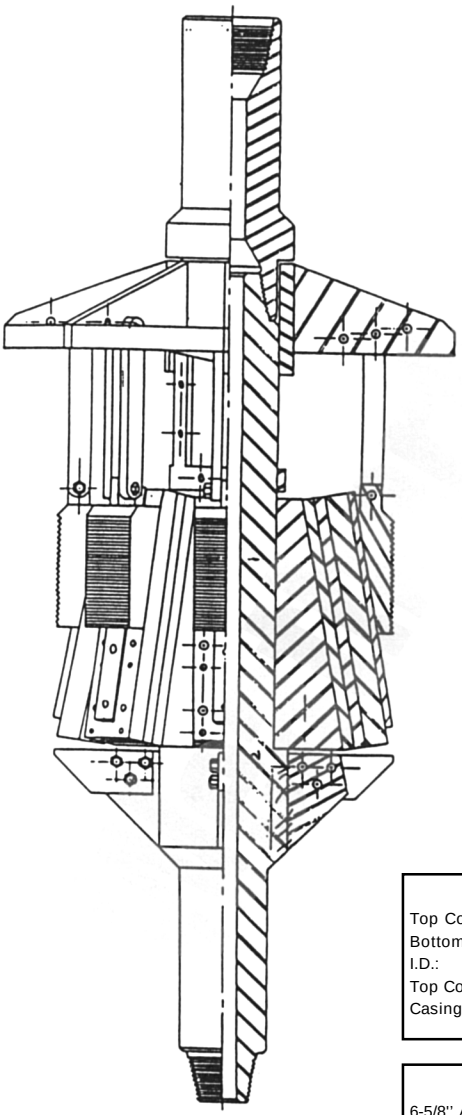
WEATHERFORD / HOMCO M.W.S.
26-42'' CASING SPEAR



Casing Spear Specifications	
Top Connection:	7-5/8'' A.P.I. Reg. Box
Bottom Connection:	6-5/8'' A.P.I. Reg. Pin
I.D.:	2-3/4''
Top Conn. Tensile Strength:	2,641,000 lbs.
Casing Range:	26'' thru 42'' all weights.

Homco Spear Pack Off

6-5/8'' A.P.I. Reg. Box
Thimbles & Cups For 30 & 36'' Casing

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BLANK

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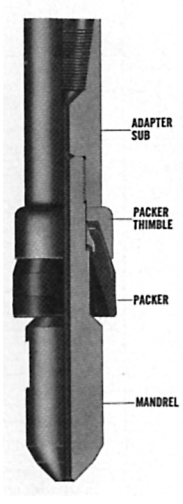
BOWEN SPEAR PACK-OFF ASSEMBLY

The SPEAR PACK-OFF ASSEMBLY is attached to the Sub Type Nut below the Spear to pack off the fish in order to circulate through the fish. The Spear Pack-Off Assembly consists of an Adapter Sub, Packer Thimble, Packer and Mandrel. The Adaptor Sub of the Spear Packoff will be furnished with a box connection to match the pin connection of the Sub Type Nut on which it is to be used, or as otherwise ordered. The Mandrel of the Spear Pack-Off may be ordered plain bull-nosed or with a pin connection for attachment of other tools, as specified.



PACKOFF ASSEMBLY

Size - (Inches) (please specify)	1-1/2 Tub	2-3/8 Tub	2-7/8 Tub 3-1/2 D.P.	3-1/2 Tub 4 Tub	4 Tub	4-1/2 Tub 4-1/2 Csg. 4-3/4 Csg.	5 Csg.	5-1/2 Csg.	6 Csg.	6-5/8 Csg.	7 Csg.	7-5/8 Csg.	8 Csg. 8-5/8 Csg. 9 Csg.	9-5/8 Csg.	10-3/4 Csg.
O.D. Adapter Sub - (Inches)	1-3/8	1-7/8	1-13/6	2-1/2	3-1/4	3-1/2	4	4	4-3/4	4-3/4	4-3/4	4-3/4	6-1/8	6-1/8	6-1/8
Complete Ass'y Part No.	18835	9590	9595	9600	9605	9604	9610	9760	9775	9780	9615	9770	9620	9625	9765
Weight	7-3/4	10-1/4	13	27-1/2	40	46	68	74	1000	104	114	120	181	210	216

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BOWEN STANDARD AND OVERSIZE PACKERS

	Size	Weight	Cup No.	Thimble No.
1-1/2'' O.D. Tub No. 18835	1-1/2'' Tub 1-1/2'' Tub	2.75 lb. 2.90 lb.	18838	18839
2-3/8'' O.D. Tub No. 9590	2-3/8'' O.D. Tub 2-3/8'' O.D. Tub	4.00 lb. 4.70 lb.	10716	6435
	2-7/8'' O.D. D.P.	10.4 lb.	12993	
2-7/8'' O.D. Tub 3-1/2'' O.D. D.P. No. 9595	2-7/8'' O.D. Tub. 2-7/8'' O.D. Tub.	6.40 lb. 6.50 lb.	10047	6436
	3-1/2'' O.D. D.P. 3-1/2'' O.D. D.P.	13.30 lb. 12.40 lb.	14082	14085
	3-1/2'' O.D. D.P. 3-1/2'' O.D. D.P.	11.20 lb. 10.20 lb.	14960	6437
3-1/2'' O.D. Tub. 4'' O.D. Tub. No. 9600	3-1/2'' O.D. Tub. 3-1/2'' O.D. Tub.	9.20 lb. 10.20 lb.	16146	16440
	3-1/2'' O.D. Tub.	7.70 lb.	16370	
	4'' O.D. Tub. 4'' O.D. Tub.	11.00 lb. 11.60 lb.	14036	6696
	4'' O.D. Tub.	9.50 lb.	14034	
4'' O.D. Tub. No. 9605	4'' O.D. Tub. 4'' O.D. Tub.	11.00 lb. 11.60 lb.	14036	6696
	4'' O.D. Tub.	9.50 lb.	14034	

	Size	Weight	Cup No.	Thimble No.
4-1/2'' Tub. No. 9604	4-1/2'' O.D. Tub.	9.5 - 13.5 lb.	13486	18319
	4-1/2'' O.D. Tub. 4-1/2'' O.D. L.P.	15.3 - 16.6 lb. 18.10 lb.	10430	16297
5'' O.D. Csg. No. 9610	5'' O.D. Csg.	13 - 15 lb.	13764	6448
	5'' O.D. Csg.	18 - 21 lb.	13489	6754
5-1/2'' O.D. Csg. No. 9760	5-1/2'' O.D. Csg.	13 - 15 lb.	13654	16183
	5-1/2'' O.D. Csg.	15.5 - 17 lb.	15277	
	5-1/2'' O.D. Csg.	17 - 23 lb.	13657	
	6'' O.D. Csg.	14 - 18 lb.	16178	18233
6'' O.D. Csg. No. 9775	6'' O.D. Csg.	22 - 23 lb.	14714	18321
	6'' O.D. Csg.	14 - 18 lb.	14721	8160
6-5/8'' O.D. Csg. No. 9780	6-5/8'' O.D. Csg.	32 - 34 lb.	15490	15532
	6-5/8'' O.D. Csg.	24 - 26 lb.	14962	18251
7'' O.D. Csg. No. 9615	7'' O.D. Csg.	17 - 20 lb.	13427	17542
	7'' O.D. Csg.	22 - 24 lb.	14232	
	7'' O.D. Csg.	26 - 30 lb.	13385	17543

(Cont. on pg. 14-27)

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(Cont. from pg. 14-26)

BOWEN STANDARD AND OVERSIZE PACKERS

	Size	Weight	Cup No.	Thimble No.
7'' O.D. Csg. No. 9615	7'' O.D. Csg.	32 - 35.3 lb.	14723	18322
	7'' O.D. Csg.	38 - 40 lb.	14144	
7-5/8" O.D. Csg. No. 9770	7-5/8'' O.D. Csg.	26.4 - 29.7 lb.	14178	6366
	7-5/8'' O.D. Csg.	29.7 - 33.7 lb.	16410	
8'' O.D. Csg. 8-1/2'' O.D. Csg. 9'' O.D. Csg. No 9620	8'' O.D. Csg. 8-1/8'' O.D. Csg.	26 lb. 32 lb.	14965	18242
	8'' O.D. Csg. 8-1/8'' O.D. Csg.	16 lb. 28 lb.	16114	17546
	8-5/8'' O.D. Csg. 9'' O.D. Csg.	28 - 36 lb. 45 lb.	16110	
	8-5/8'' O.D. Csg. 9'' O.D. Csg.	36 - 40 lb. 55 lb.	16112	
	8-5/8'' O.D. Csg.	40 - 49 lb.	16114	
9-5/8'' O.D. Csg. No. 9625	9-5/8'' O.D. Csg.	36 - 43.5 lb.	10354	17575
10-3/4'' O.D. Csg. No 9765	10-3/4'' O.D. Csg.	32.7 - 55.5 lb.	13197	1478
	11-3/4'' O.D. Csg.	38 - 60 lb.	14246	14248

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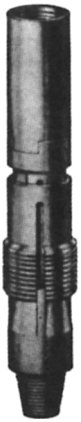
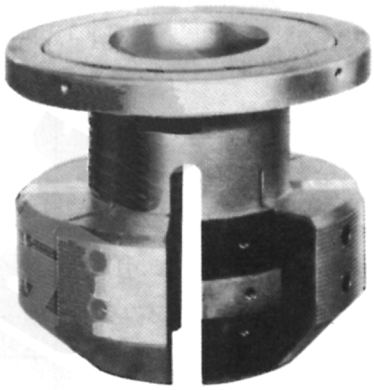
HOUSTON ENGINEERS "EFL" UNIVERSAL ROTATING AND RELEASING SPEAR

USE: The H-E "EFL" Universal Rotating and Releasing Spear will penetrate the ID of tubing, drill pipe or casing. It will deliver tremendous torque in back-off operations, in combination with the H-E reversing tool, yet maintain an easy positive release.



Spear



Slip Carrier For 11 3/4" To 18 3/4" O.D.
Spear For 16" To 30" Casing

SIZES RANGE FROM 2" TUBING THRU 30" CASING

"EFL" Rotating & Releasing Assembly

Nominal Size - In.	2	2-1/2	3	4	4	5	5	6-5/8	6-5/8	6-5/8
Catch Size - In.	2 Tubing	2-1/2 Tubing	3-1/2 Tubing	4 Casing	4-1/2 Casing	5 Casing	5-1/2 Casing	6-5/8 Casing	7 Casing	7-5/8 Casing
Spear OD - In.	1-29/32	2-5/16	3-1/2	3-1/8	3-1/8	4-1/16	4-1/16	5-11/16	5-11/16	5-11/16
Spear ID - In.	3/8	3/8	1/2	1	1	1-1/4	1-1/4	2-1/4	2-1/4	2-1/4
Spear Length - In.	30	30	38	40	40	47	47	50	50	50
Comp. Assy.										
*Pt. No.	14272	14273	14274	14275	14807	14276	14808	14277	14809	14810
Wt.-Lbs.	25	35	50	65	75	125	155	250	260	270

Nominal Size - In.	8-5/8	8-5/8	8-5/8	8-5/8	13-3/8	13-3/8	13-3/8	13-3/8	24	30
Catch Size - In.	8-5/8 Casing	9-5/8 Casing	10-3/4 Casing	11-3/4 Casing	13-3/8 Casing	16 Casing	18-5/8 Casing	20 Casing	24 Casing	30 Casing
Spear OD - In.	7-1/4	7-1/4	7-1/4	7-1/4	11-3/4	11-3/4	11-3/4	11-3/4	183/4	18-3/4
Spear ID - In.	3	3	3	3	3-3/4	3-3/4	3-3/4	3-3/4	4	4
Spear Length - In.	55	55	55	55	60	60	60	60	72	72
Comp. Assy.										
*Pt. No.	14278	14812	14813	14814	14279	14815	14816	14817	14818	14819
Wt.-Lbs.	460	500	525	550	1560	1700	1850	1950	4800	4900

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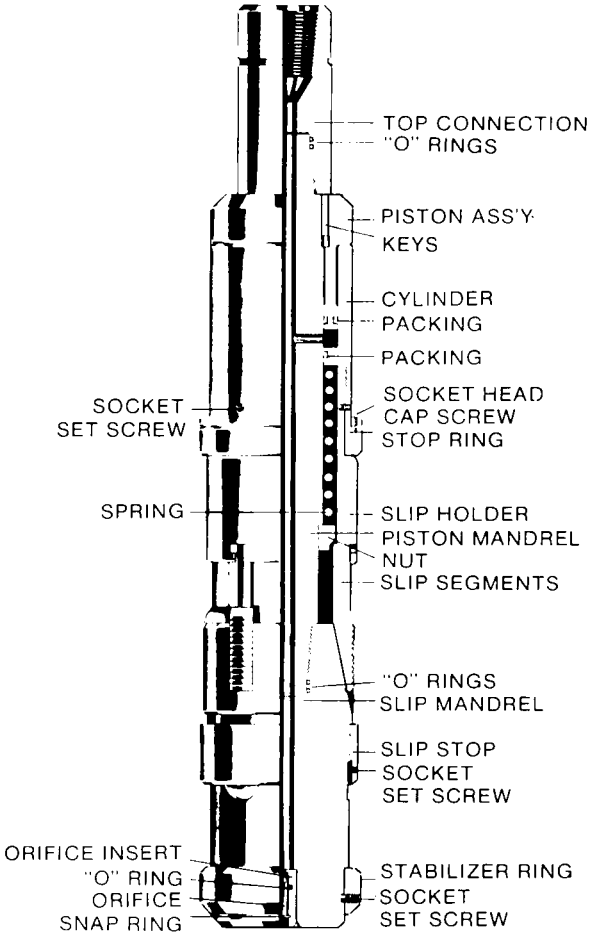
A-Z HYDRAULIC SPEAR



SPECIFICATIONS

Nominal Casing Size	9-5/8''	13-3/8''
Tool O.D.	8-1/4''	11-3/4''
Tool I.D.	2''	2-1/2''
Top Connection Box Up	4-1/2'' I.F.	6-5/8'' Reg.
Assembly No.	HSP 9	HSP 13
Assembly Wt.	725 lbs.	1620 lbs.

For operation see next page.

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A-Z HYDRAULIC SPEAR

OPERATION

The A-Z Hydraulic Spear is easy to operate and maintain. If the spar is run for conventional fishing purposes, a stop ring is installed on the tool. The spear is made up on the bottom of the string and run into the hole. When the slips enter the fish and the stop ring contacts the top of the pipe, a sharp decrease of string weight will be noted, indicating that the fish has been entered. As a note of caution, sufficient weight should be applied to the string to insure that the bumper ring is resting solidly upon the top of the fish.

If the spear is to be run as a stringer type, the stop ring is removed form the tool. When running the tool as a stringer type it should be lowered several feet into the fish in order that a firm grip on the pipe will be maintained and also to reduce the tendency to split the fish if severe pulling or jarring is necessary.

Once the fish is engaged the hydraulic spear is designed to operate by pump pressure. The pumps are turned on and a pressure drop across the orifice in the tool of 800-1000 PSI is maintained to set the slips. Tension is then applied to the drill string. The weight indicator will immediately reflect the increase in tension. Once the fish is caught the pumps may be shut off. The fish is then pulled or jarred from the hole.

To release the hydraulic spear, the pumps must be turned off and the bleeder valve opened to equalize pressure between the drill string and annulus. Spud the drill string and jar the spear down to break the friction hold between the slips and casing. Once the friction hold between the slips and casing is broken, the slips will retract into the tool body and will remain locked in that position while the tool is being withdrawn from the hole. Since the slips remain in the locked position, the tool may be withdrawn from the hole as fast as desired. However, if for any reason it is desired to re-set the spear, the application of sufficient pump pressure will again place the slips in the catch position.

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WEATHERFORD MCCULLOUGH ROTARY RELEASING SPEAR

SPECIFICATIONS

Size Spear O.D.	Circ. Hole	A.P.I. Drill Pipe Tool Joint Box Up	Size Pipe to Catch	Shipping Wt. Boxed (lbs.)
1-7/8''	None	2-7/8'' D.P. Pin	2'' Tubing	125
2-5/16''	None	2-3/8'' A.P.I. T.J.	2-1/2'' Tubing	140
2-7/8''	None	2-3/8'' A.P.I. T.J.	3'' Tubing	152
3-5/16''	5/8''	2-3/8'' A.P.I. T.J.	4'' O.D. Casing	160
3-13/16	5/8''	2-7/8'' A.P.I. T.J.	4-1/2'', 4-3/4'' & 5'' .D.Csg.	170
4-5/8''	7/8''	3-1/2'' A.P.I. T.J.	5-1/2'' & 5-3/4'' O.D. Csg.	227
5-5/8''	1-1/2''	4-1/2'' A.P.I. T.J.	6-5/8 & 7'' O.D. Csg.	370
6-1/2''	1-1/2''	4-1/2'' A.P.I. T.J.	7-5/8'' O.D. Casing	420
7''	2''	5-1/2'' A.P.I. T.J.	8-1/8'' O.D. Casing	638
7-1/2''	2''	5-1/2'' A.P.I. T.J.	8-5/8'' & 9'' O.D. Casing	790
8-1/4''	2-1/2''	6-5/8'' A.P.I. T.J.	9-5/8'' O.D. Casing	915
9-1/2''	4''	6-5/8'' A.P.I. T.J.	10-3/4'' O.D. Casing	1060
10-1/2''	4''	6-5/8'' A.P.I. T.J.	11-3/4'' O.D. Casing	1240
12-1/8''	4''	6-5/8'' A.P.I. T.J.	13-3/8'' O.D. Casing	1560

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WEATHERFORD MCCULLOUGH
ROTARY RELEASING SPEAR
Slip Selection

Spear O.D. & Slip Size	Recommended Range	Theoretical Range
1-7/8 - A	1.937 - 2.014	1.844 - 2.108
1-7/8 - B	2.062 - 2.170	2.000 - 2.264
1-7/8 - C	2.156 - 2.264	2.094 - 2.358
2-5/16 - A	2.406 - 2.502	2.266 - 2.596
2-5/16 - AA	2.593 - 2.767	2.531 - 2.861
2-5/16 - B	2.891 - 3.033	2.797 - 3.127
2-5/16 - C	3.141 - 3.282	3.047 - 3.282
2-7/8 - A	2.969 - 3.130	2.828 - 3.224
2-7/8 - B	3.141 - 3.349	3.047 - 3.443
3-5/16 - A	3.436 - 3.681	3.342 - 3.775
3-5/16 - B	3.641 - 3.886	3.547 - 3.980
3-5/16 - C	3.873 - 4.118	3.779 - 4.212
3-13/16 - A	3.906 - 4.149	3.748 - 4.243
3-13/16 - AA	4.029 - 4.336	3.935 - 4.430
3-13/16 - B	4.279 - 4.586	4.185 - 4.680
3-13/16 - C	4.529 - 4.836	4.435 - 4.930
3-13/16 - D	4.779 - 5.086	4.685 - 5.180
4-5/8 - A	4.750 - 4.935	4.532 - 5.060
4-5/8 - B	4.813 - 5.091	4.688 - 5.216
4-5/8 - BB	4.985 - 5.263	4.860 - 5.388
4-5/8 - C	5.157 - 5.435	5.032 - 5.560
4-5/8 - CC	5.345 - 5.623	5.220 - 5.748
4-5/8 - CCC	5.532 - 5.810	5.407 - 5.935
5-5/8 - A	5.781 - 5.986	5.548 - 6.142
5-5/8 - AA	5.860 - 6.142	5.704 - 6.298
5-5/8 - B	6.016 - 6.298	5.860 - 6.454
5-5/8 - BB	6.266 - 6.548	6.110 - 6.704
5-5/8 - C	6.625 - 6.923	6.485 - 7.079
5-5/8 - CC	6.680 - 7.142	6.704 - 7.298
5-5/8 - D	7.079 - 7.361	6.923 - 7.517
5-5/8 - DD	7.391 - 7.673	7.235 - 7.829
7-1/2 - A	7.687 - 7.999	7.394 - 8.186
7-1/2 - AA	7.956 - 8.375	7.770 - 8.562
7-1/2 - B	8.331 - 8.749	8.144 - 8.936
7-1/2 - BB	8.831 - 9.249	8.644 - 9.436
7-1/2 - C	9.519 - 9.937	9.332 - 10.124
7-1/2 - CC	10.003 - 10.421	9.816 - 10.608
7-1/2 - D	12.082 - 12.500	11.895 - 12.687
7-1/2 - E	12.394 - 12.812	12.207 - 12.999

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WEATHERFORD HOMCO DIFFERENTIAL PACKER

Tool O.D.:	4-3/4'' @Top & Bottom Connection & 4-3/4'' @Travel
Conn.:	Collar
Mandrel O.D.:	3-1/2'' I.F.
Tensile Strength:	2-1/2''
Mandrel I.D.:	400,000#
Element O.D.:	1-1/8''
	5-1/2''

Tool O.D.:	5-3/4'' @Top & Bottom Connection & 6-3/4'' @Travel ollar
Conn.:	4-1/2'' F.H.
Mandrel O.D.:	3-1/2''
Tensile Strength:	760,000#
Mandrel I.D.:	1-3/4''
Element O.D.:	7'', 7-3/4'', 11''

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WEATHERFORD
HOMCO WASHOVER DRILL COLLAR SPEAR

The HOMCO Washover Drill Collar Spear is used most advantageously when washing over a fish that is stuck off bottom to prevent its falling when it becomes free It can also be used to recover a fish stuck on bottom whose length requires only one washover operation.

The HOMCO Washover Spear enables the operator to wash over and recover the fish with one trip into the hole, resulting in a saving of rig time. Positive engagement is made with the fish prior to the commencement of washover operations, making it impossible for the fish to fall. The washover pipe can be retrieved upon its return to the surface without first removing the fish.

The HOMCO Washover Spear is installed in the bottom joint of washover pipe by means of a shear pin bushing. Accessory tools recommended for use on the lower end of the spear include a bumper jar and a shear pin safety joint. The washover string is lowered into the hole until contact is made with the fish. The safety joint is screwed into the fish and the pins sheared in the shear pin bushing. This places the slips in the catch position, which allows circulation and rotation in order to wash over the fish. When the fish has been washed free, downward movement of the fish, which is attached to the washover spear, causes the slips to catch or anchor in the washover pipe. The fish and the washover pipe are retrieved simultaneously. A unique feature enables the operator to remove first the washover pipe and then the fish.

Specifications

Identification No.	O.D.	Upper Connection	Slip Catch Range
353-805	3-15/16	2-3/8 API i.F.	4.198-4.990
353-810	5-3/4	4-1/2 API F.H.	6.184-7.825
353-815	7-3/8	4-1/2 API F.H.	7.825-8.835

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BOWEN-LEBUS ANCHOR WASHPIPE SPEAR

(PATENTED)

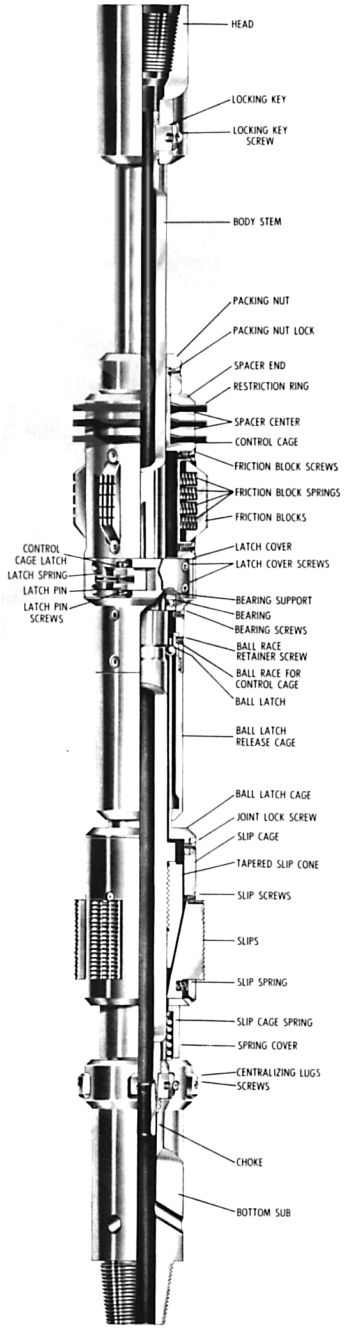
GENERAL DESCRIPTION

The Bowen-Lebus Anchor Washpipe Spear is specifically designed for the purpose of aiding in washing over and retrieving stuck drill stem, when stuck off bottom, with safety to prevent the dropping of the washed over and freed ƀsh. This can be accomplished in a single round trip, thus effecting a considerable time saving.

The Bowen-Lebus Anchor Washpipe Spear when in service is always in position to automatically catch the ƀsh off bottom, when being run into the well, while being raised or lowered to make kelly connections, or when coming out of the hole.

The Bowen-Lebus Anchor Washpipe Spear is one of the most versatile tools ever designed for washover fishing operations. The method of anchoring this Spear inside the washpipe is to expand the catching slips with a threaded tapered cone and without using a special landing collar or nipple for making connection with the sh.

When the Washpipe Spear is anchored properly inside the washpipe, it will not release due to rotation of the washpipe and Spear. Neither will it release by the application of any amount of weight applied against the Spear slips while being lowered into the well, but only after the operator has connected onto the fish by right-hand rotation where this is required. After connecting onto the ƀsh by right-hand rotation, the slips of the Washpipe Spear may be released by continued right-hand rotation and tension load on the washpipe string. If the washover starts as soon as the washpipe will turn over the spear, the slips will drag, causing excessive wear on the slips.



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USE

The Bowen-Lebus Anchor Washpipe Spear is designed to be run inside washover pipe. It engages the Fish at its lower end, usually by a threaded connection, preventing the fish from dropping to the bottom when it is washed loose. The Anchor Washpipe Spear will recover drill pipe, drill collars, packers, bridge plugs, etc., that are to be washed over, either off bottom or on bottom, and bring the fish out of the hole, inside the washpipe, after it has been washed loose. This saves additional trips with the þshing string.

Fishing Spears, taper taps or other applicable þshing tools may be run on the Anchor Washpipe Spear to engage the þsh.

The Bowen-Lebus Unlatching Joint should always be run between the Washpipe Spear and the þsh.

When the Bowen-Lebus Anchor Washpipe Spear is not available, various methods are attempted for the release of a stuck drill stem. Among these are; mixing oil in the drilling mud; inserting jars and bumper subs in the string; using explosives in the string, and as a last resort, washing over.

By using the Bowen-Lebus Anchor Washpipe Spear, washing over need no longer be considered as a last resort.

CONSTRUCTION

The Bowen-Lebus Anchor Washpipe Spear consists essentially of a Head, Body Stem, Control Cage, Restriction Rings, Slips, Friction Blocks, Choke, Ball Latch, Slip Cone, Ball Latch Cage, Centralizing Lugs and Bottom Sub.

The parts that comprise the Bowen-Lebus Anchor Washpipe Spear are manufactured from carefully selected, high grade alloy steel, fully heated treated to obtain the best quality of operation and long life.

The Bowen-Lebus Anchor Washpipe Spear is available in all drill pipe sizes from 2-3/8" A.P.I. Regular 3-1/4" O.D. through 5-1/2" A.P.I. Regular 8-1/4" O.D., inclusive.

These tools may be dressed with oversize Slips, Restriction Rings, Friction Blocks and Centralizer Lugs, to allow operation in larger sizes than the size for which the tool was designed.

Each Slip (part 12) marked with the size range of washpipe inside diameter in which it is used.

Restriction Ring (part 4) should be 1/16" smaller than the inside diameter of the washpipe in which they are used.

The Friction Blocks (part 5) are marked with size numbers which match the size number marked on the Slips.

Centralizer Lugs (Part 14-A) are marked with the size number to indicate the inside diameter in which they are used.

All oversize parts may be changed without completely disassembling the Washpipe Spear.

In the larger three sizes JCF-27, JCF-28 and JCF-29, it is important to use a choke (part 15) which has less area than exists between the washpipe and drill collars, or the area between the washpipe and well bore, being certain it is small enough for the rig mud pump to provide adequate fluid to operate the restriction rings.

(Cont. on pg. 14-37)

(Cont. from pg. 14-36)

CALCULATED STRENGTH TABLE
BOWEN-LEBUS ANCHOR WASHPIPE SPEARS

TOOL NO.	JCF-23	JCF-24	JCF-25	JCF-26	JCF-27	JCF-28	JCF-29
BODY O.D.	3-1/4	4	4-9/16	5-7/16	5-13/16	6-7/16	8-1/4
CONNECTIONS	2-3/8 Reg.	2-3/8 I.F.	2-7/8 I.F.	3-1/2 I.F.	4-1/2 F.H.	4-1/2 F.H.	5-1/2 Reg.
I.D.	3/4	1	1-1/8	1-1/4	1-25/32	2	2
COMPLETE ASSEMBLY Part No. Wt.	 38139 85	 38189 145	 38224 185	 38260 280	 38299 330	 38337 410	 38550 480

CALCULATED STRENGTHS

TENSILE STRENGTH @ Yield–In Lbs.	93,000	192,732	279,480	487,320	553,000	822,960	822,960
TORQUE STRENGTH @ Yield–In Ft.-Lbs.	1,063	3,023	5,633	11,346	14,000	24,934	24,934
RECOMMEND MAXIMUM * Pull–In Lbs.	61,400	127,000	184,300	322,000	364,000	543,000	543,000

* Based on 66% of Calculated Yield Strength

NOTE: These calculations are based on the yield strength of the material. They are theoretical, and do not constitute any guarantee; actual or implied.

For operation procedures and parts list – see Bowen Manual # 5/2900.

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SECTION 15
SPECIAL SERVICE PROBLEMS

Page

Special Service Problems 1-7

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SPECIAL SERVICE PROBLEMS

9.1
CRITICAL ROTARY SPEEDS.

Critical rotating speeds in drill pipe strings which cause vibrations are often the cause of crooked drill pipe, excessive wear, and rapid deterioration and fatigue failure. Critical speeds will vary with length and size of drill stem and collars and hole size. There is evidence in recent field tests that excessive power is required at the rotary to maintain a constant speed at critical conditions. This power indicator, plus surface evidence of vibration, should warn the crew that they are in the critical range.

Two types of vibration may occur. The pipe between each tool joint may vibrate in nodes, as a violin string. This critical speed may be predicted approximately by the formula:

$$RPM = \frac{4{,}760{,}000}{l^2} (D^2 + d^2)^{1/2} \qquad 9.11$$

Where:
RPM = critical speed, revolutions per minute
l = length of one pipe, inches
D = outside diameter of pipe, inches
d = inside diameter of pipe, inches.

The critical speed predicted by this formula is probably accurate within 15%. On this basis the following rotary speeds should be avoided by at least 15% (higher or lower).

Table 9.1
Pipe Sizes Vs. Critical Rotary Speeds

1	2
Pipe Size In.	Approx. Critical Rotary Speed RPM
2-3/8	110
2-7/8	130
3-1/2	160
4	185
4-1/2	210
5	235
5-1/2	260

These critical speeds are shown as vertical lines on Fig 9.2

The second type of vibration is of the spring pendulum type, and may be approximately predicted by the following formula:

$$RPM = \frac{258{,}000}{L} \qquad 9.12$$

Where:
RPM = critical speed, revolutions per minute
L = total length of string, feet.

Secondary and higher harmonic vibrations will occur at 4, 9, 16, 25, 36, etc., times the speed in equation 9.12.

The critical speeds of the spring pendulum type vibration, and the harmonic speeds are plotted as sloping lines in Fig. 9.2.

The vibrations of the spring pendulum type (formula 9.12) are probably less significant than the node type (formula 9.11). Each higher harmonic of the spring pendulum type vibration is also less significant.

Particular care should be taken to avoid operating under those conditions which would be the critical speed for both types of vibration because the combination would be particularly bad.

The well depths and rotary speeds for which the critical speeds for the two types of vibration coincide are given by the intersection of the sloping and vertical lines in Fig. 9.2, and are tabulated in Table 9.2.

NOTE: More detail on this subject may be found in the Walter Main discussion of the paper titled Causes and Prevention of Drill Pipe and Tool Joint Troubles," *available from Hughes Tool Company.*

9.2
TRANSITION FROM DRILL PIPE TO DRILL COLLARS.

Frequent failure in the joints of drill pipe just above the drill collars suggest abnormally high bending stresses in these joints. This condition is particularly evident when the hole angle is increasing with depth and the bit is rotated off bottom. Low rates of change of hole angle combined with deviated holes may result in sharp bending of the first joint of drill pipe above the collars. When joints are moved from this location and rotated to other sections, the effect is to lose identity of these damaged joints. When these joints later fail through accumulation of additional fatigue damage, every joint in the string becomes suspect. One practice to reduce failures at the transition zone and to improve control over the damaged joints is to use nine or ten joints of heavy wall pipe, or smaller drill collars, just above the collars. These joints are marked for identification, and in the transition zone. They are inspected more frequently than regular drill pipe to reduce the likelihood of service failures. The use of heavy wall pipe reduces the stress level in the joints and insures longer life in this severe service conditions.

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TABLE 9.2
COINCIDENCE OF WELL DEPTH & ROTARY SPEED FOR TWO TYPES VIBRATION

1	2	3	4	5	6
Drill Pipe O.D. In.	Speed RPM	Vibration Coincidence Depths ft			
2-3/8	110	2300	9400	21000	.....
2-7/8	130	1960	8000	18000	32000
3-1/2	160	1600	6600	14800	26000
4	185	1390	5600	12700	22000
4-1/2	210	1200	5000	11200	19700
5	235	1100	4500	10000	17500
5-1/2	260	980	4000	9000	15900

FISHING TECHNIQUES

9.3
PULLING ON STUCK PIPE.

It is normally not considered good practice to pull on stuck drill pipe beyond the limit derived from the API-IADC Used Drill Pipe Classification System (Table 10.1) utilizing remaining cross sectional area as an important criteria. It must be assumed that the pipe is near the minimum cross sectional area of its class and will fail in tension if the load is excessive. For example, assuming a string of 5 in., 19.5 lb/ft. Grade E drill pipe is stuck, the following approximate values for maximum hook load would apply:

Class 2 311,000 lbs
Class 3 240,000 lbs

The stretch in the drill pipe due to its own weight suspended in a fluid should be considered when working with drill pipe and the proper formulas to use for stretch when free or stuck should be used.

Example I: (see Appendix A. Par. A.6 for derivation)
Determine the stretch in a 10,000 ft. string of drill pipe freely suspended in 10 lb/gal drilling fluid.

$$e = \frac{L_1^2}{9.625 \times 10^7} \quad [65.44 - 1.44\ Wg] \qquad 9.31$$

$$= \frac{10{,}000^2}{9.625 \times 10^7} \quad [65.44 - 1.44 \times 10]$$

$$= 53.03 \text{ in.}$$

Where: L_1 = length of free drill pipe, feet
W_g = weight of drilling fluid, lb/gal
e = total elongation, inches

Example II: (see Appendix A, Par. A.4 for derivation)
Determine the free length in a 10,000 ft string of 4-1/2 in. O.D. 16.60 lb/ft. drill pipe which is stuck, and which stretches 49 in. due to a differential pull of 80,000 lbs.

$$L_1 = \frac{735{,}294 \times e \times W_{dp}}{P} \qquad 9.32$$

$$= \frac{735{,}294 \times 49 \times 16.60}{80{,}000}$$

$$= 7176 \text{ ft}$$

Where: L_1 = length of free drill pipe, feet
e = total elongation, inches
W_{dp} = weight of drill pipe, pounds per foot
P = load, pounds

9.4
JARRING.

It is common practice during fishing, testing, coring and other operations to run rotary jars to aid in freeing stuck assemblies. Normally, the jars are run below several drill collars which act to concentrate the blow at the fish. It is necessary to take the proper stretch to produce the required blow. The momentum of the moving mass of drill collars and stretched drill pipe returning to normal causes the blow after the jar hammer is tripped. A hammer force of three or four times the excess of pull over pipe weight is possible depending on type and size of pipe, number (weight) of drill collars, drag, jar travel, etc. This force may be large enough to damage the stuck drill pipe and should be considered when jarring operations are planned.

9.5
TORQUE IN WASHOVER OPERATIONS.

Although little data are available on torque loads during washover operations, they are significant. Friction and drag on the wash pipe cause considerable increases in torque on the tool joints and drill pipe, and should be considered when pipe is to be used in this type service. This is particularly true in directionally drilled wells and deep straight holes with small tolerances. (See Par. 9.6)

9.6
Allowable hookloads and torque combinations for stuck drill strings may be determined by use of the following formula:

$$QT = \frac{.096167J}{D}\sqrt{Ym^2 \quad \frac{P^2}{A^2}} \qquad 9.61$$

Where Qt = Minimum Torsional Yield Strength Under Tension, lb-ft.
J = Polar Moment of Inertia
$= \frac{\div}{32}$ (D4 - d4) For Tubes
D = Outside Diameter - inches
d = Inside Diameter - inches
Y_m = Minimum Unit Yield Strength - psi
Ss = Minimum Unit Shear Strength - psi
(Ss = .577 Y_m)
P = Total Load In Tension - pounds
A = Cross Section Area

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An example of the torque which may be applied to the pipe which is stuck while imposing a tensile load is:

Assume: (1) 3-1/2 in. O.D. 13.30 lb Grade E drill pipe
(2) 3-1/2 I.F. tool joints
(3) Stuck point: 4000 feet
(4) Tensile pull: 100,000 pounds
(5) New drill pipe

$$\text{Then: } Qt = \frac{.096167 \times 9.00}{3.5}\sqrt{(75{,}000)^2 - \frac{(100{,}000)^2}{(3.62)^2}}$$

$$Qt = 17{,}216 \text{ lb-ft.}$$

For further information an allowable hookloads, torque application, and pump pressure use, refer to Stall and Blenkarn: *Allowable Hook Load and Torque Combinations For Stuck Drill Strings.*[12]

BIAXIAL LOADING OF DRILL PIPE

9.7

The collapse resistance of drill pipe corrected for the effect of tension loading may be calculated by reference to Fig. 9.3 and the use of formulas and physical constants contained in Par. 9.8, 9.9, 9.10, and 9.11.

9.8

FORMUAS AND PHYSICAL CONSTANTS.

The ellipse of biaxial yield stress shown in Fig. 9.3 is for use in the range of plastic collapse only, and gives the relation between axial stress (psi) in terms of average yield stress (psi) and effective collapse resistance in terms of nominal plastic collapse resistance. This relationship is depicted in the following formula:

$r^2 + rz + z^2 = 1$, having solutions as follows:

$$(1)\ z = \frac{-r + \sqrt{4 - 3r^2}}{2}, \text{ and}$$

$$(2)\ r = \frac{-z + \sqrt{4 - 3z^2}}{2}$$

Where:

$$(3)\ r = \frac{\text{Effective collapse resistance under tension (psi)}}{\text{Nominal plastic collapse resistance (psi)}}$$

$$(4)\ z = \frac{\text{Total tensile loading (pounds)}}{\text{Cross section area x Average yield strength}}$$

Average yield strengths in psi are as follows:

Grade E	85,000
Grade X95	110,000
Grade G105	120,000
Grade S135	145,000

9.9

TRANSITION FROM ELASTIC TO PLASTIC COLLAPSE.

Material in the elastic range when under no tensile load, transfers to the plastic range when subjected to sufficient axial load. Axial loading, below the transition load, has no effect on elastic collapse. At transition point, the collapse resistance under tension equals the nominal elastic collapse, and also equals a tension factor (r) times collapse resistance as calculated from the nominal plastic formula.

Method: Determine values for both elastic and plastic collapse from applicable formulas in Appendix A, substitute in formula (3) Par 9.8 and solve for r. Then, solve formula (1), Par 9.8, for z. For the total tension (transition) load, substitute value of z in formula (4), Par. 9.8.

9.10

EFFECT OF TENSILE LOAD ON COLLAPSE RESISTANCE.

The effect of tensile load applies only to greater than transition, load on normally elastic items, and to any load on plastic collapse items. In either case, the value determined from the plastic collapse formula (Appendix A) is to be modified.

Method: Substitute the tensile load value in formula (4), Par. 9.8, to find a value for z. Substitute this value in formula (2), Par. 9.8, to permit solution for r. Next, substitute the value of r in formula (3), Par 9.8, to obtain the effective collapse resistance under tension.

9.11

EXAMPLE CALCULATION OF BIAXIAL LOADING.

An example of the calculation of drill pipe collapse resistance, corrected for the effect of tensile load is:

Given: String of 5 inch O.D., 19.50 lb per ft., Grade E Premium Class drill pipe.

Required: Determine the collapse resistance corrected for tension loading during drill stem test, with drill pipe empty and 15 lb per gal. mud behind the drill pipe. Tension of 50,000 lb on the joint above the packer.

Solution: Find reduced cross section area of Premium Class drill pipe as follows:
Nominal O.D. = 5 inches, Nominal wall thickness = .362 inches
Nominal I.D. = 4.276 inches
Reduced wall thickness for Premium Class = (0.8 x .362) = .2896 inches
Reduced O.D. for Premium Class = 4.8552 inches

Cross sectional area for Premium Class = Reduced O.D. area - Nominal I.D. area
= 18.5141 - 14.3603
= 4.1538 sq. inches
Tension load on bottom joint = $50{,}00\sqrt{4.1538}$
= 12037 psi
Average yield strength for Grade E drill pipe = 85,000 psi
Percent tensile stress to average yield strength

$$= \frac{12037}{85{,}000} \times 100$$

= 14.16 %

Enter Fig. 9.3 at 14.16% on upper right horizontal scale and drop vertically to intersect right-hand portion of the ellipse. Proceed horizontally to the left and intersect Nominal Collapse Resistance (center vertical scale) at 92%.

Minimum collapse resistance for Premium Class (Table 2.5) = 7070 psi.
Corrected collapse resistance for effect of tension = (7070 x 9.2)
= 6504 psi.

CAUTION: No safety factors are included in this example calculation.

NOTE: Use reduced values for cross sectional area, tension, and collapse rating for the appropriate class (Premium, Class 2, Class 3) of used drill pipe being considered.

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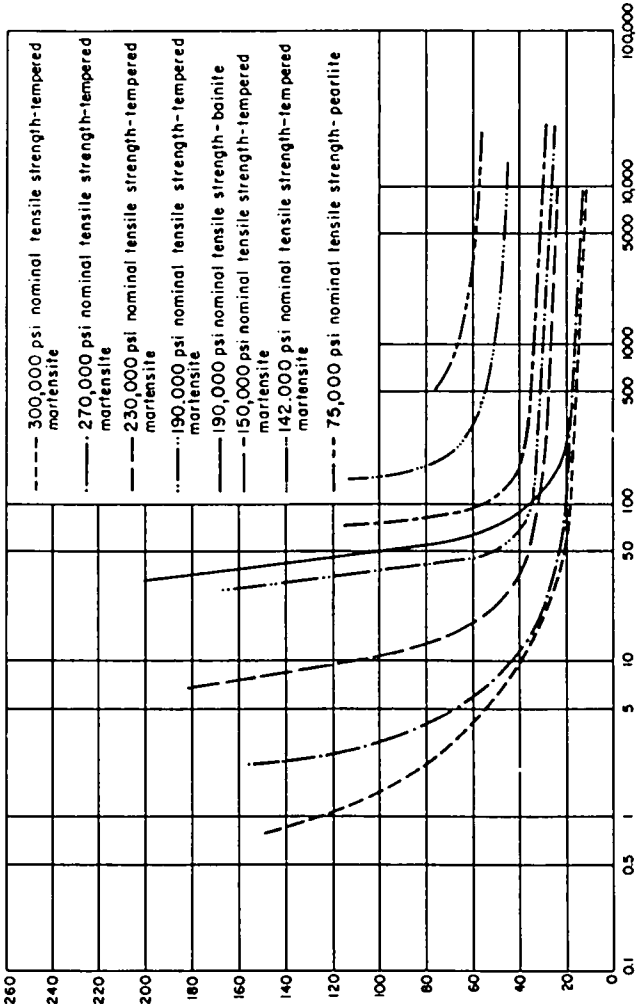

Fig. 9.1

DELAYED-FAILURE CHARACTERISTICS OF UNNOTCHED SPECIMENS OF AN SAE 4340 STEEL DURING CATHODIC CHARGING WITH HYDROGEN UNDER STANDARDIZED CONDITIONS

Batelle Charging Condition A:

Electrolyte: 4 per cent by weight of H_2SO^4 in water

Poison: 5 drops per litre of cathodic poison composed of 2g phosphorous dissolved in 40 ml CS^2

Current Density: 8 ma/in.^{2}

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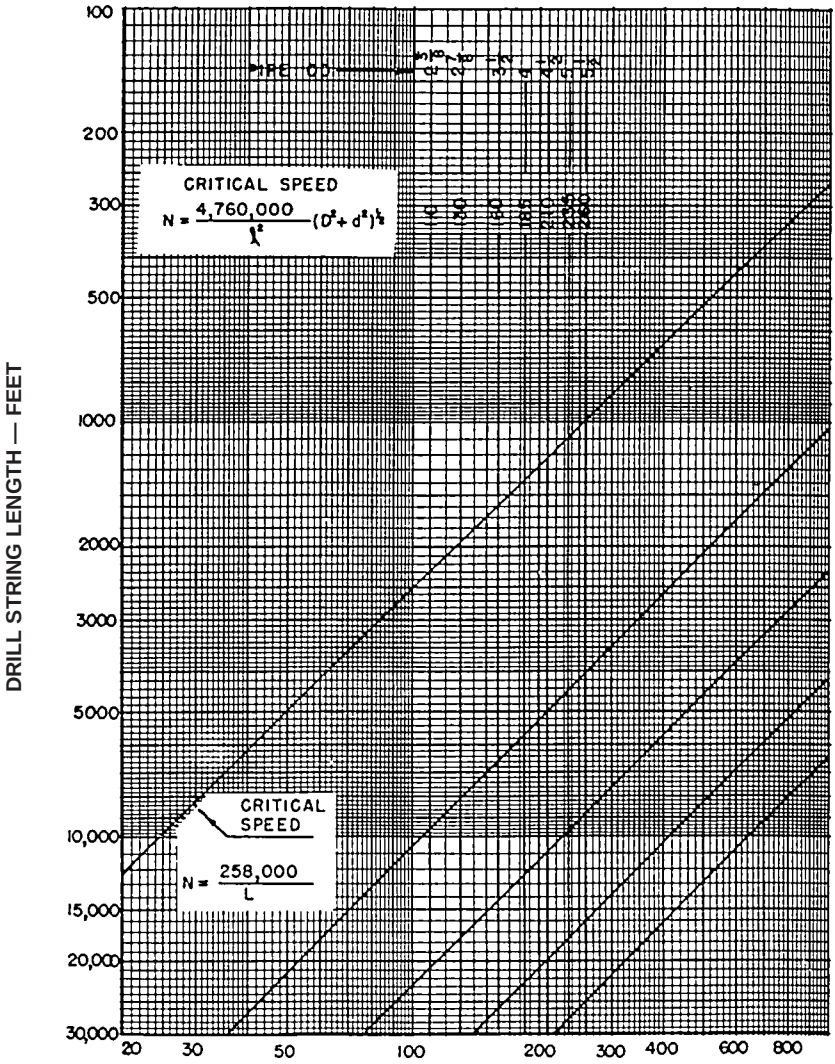

FIG. 9.2
CRITICAL ROTARY SPEEDS IN DRILL PIPE

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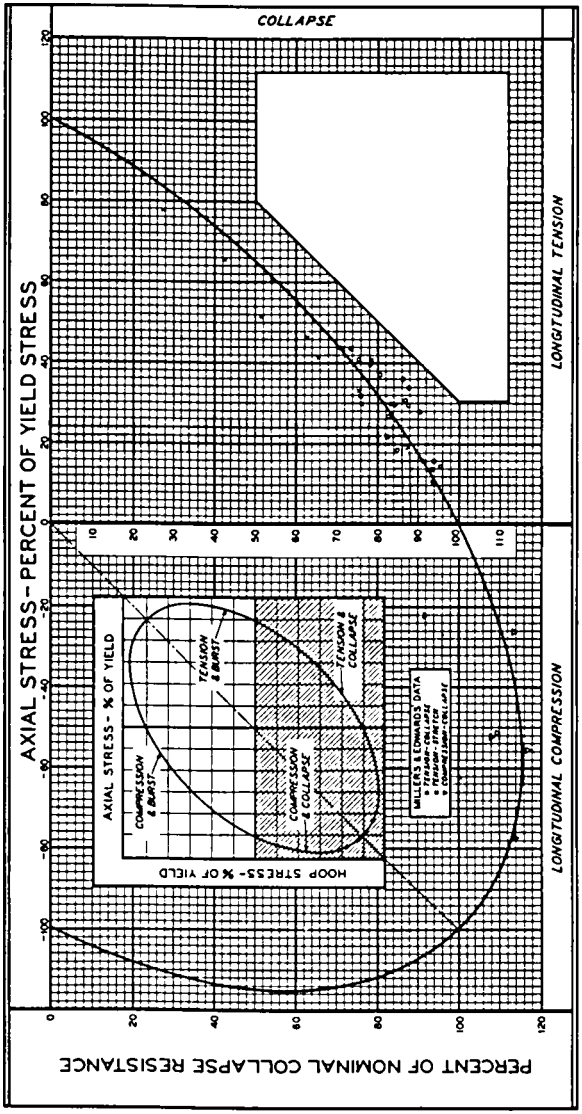

FIG. 9.3
ELLIPSE OF BIAXIAL YIELD STRESS[37]
OR
MAXIMUM SHEAR — STRAIN ENERGY DIAGRAM
After Holmquist and Nadai; Collapse of Deep Well Casing, API Drilling and Production Practice (1939)
NOTE: Applies only in a non-corrosive environment

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Company symbol, month welded, year welded, pipe mill symbol and drill pipe grade code are to be stenciled at the base of the pin.

PIPE MILL CODE

Pipe Mill	Symbol
Armco	A
British Steel	B
CF & I Steel Corp.	C
Dalmine S.P.A., Italy	D
Falck, Italy	F
Kawasaki Steel	H
Nippon Steel Corp.	I
J & L Steel	J
Nippon Kokan Kabushiki	K
Lone Star	L
Mannesmannrohren-Werke	M
U.S. Steel	N
Ohio Steel Tube	O
Wheeling-Pittsburgh	P
Republic Steel	R
Sumitomo Metal Ind.	S
TAMSA	T
Vallourec	V
Babcock & Wilcox	W
Algoma	X
Youngstown	Y
TI Steel Tube Div.	Z
American Seamless Tube	A1
Tubemeuse	TU
Voest	VA
Used	U

MONTH AND YEAR WELDED

Month	Year
1 Through 12	Last two digits of year

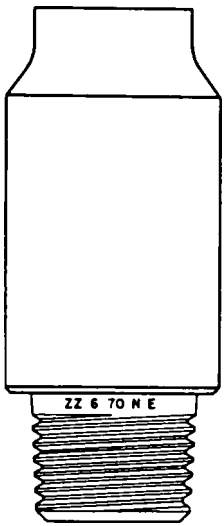
DRILL PIPE GRADE CODE

Grade	Symbol
N-80	N
E	E
C-75	C
X-95	X
G-105	G
S-135	S
V-150	V

HEAVY WEIGHT DRILL PIPE
(DOUBLE STENCIL PIPE GRADE CODE.)

SAMPLE MARKINGS AT BASE OF PIN

1	2	3	4	5
ZZ	6	70	N	E



1 — Company Symbol
ZZ Company (Fictional for example only)

2 — Month Welded
6 - June

3 — Year Welded
70 - 1970

4 — Pipe Mill
N - United States Steel Company

5 — Drill Pipe Grade
E - Grade E Drill Pipe

FIG. 10.1
MARKING ON TOOL JOINTS FOR IDENTIFICATION OF DRILL STRING COMPONENTS

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SECTION 16
STRETCH DATA

	Page
Tubing, Drill Pipe, and Casing Stretch Data	1 - 2
Tubing Stretch Table	3 - 4
Drill Pipe Stretch Table	5
Casing Stretch Table	6 - 7
Pipe Recovery	8 - 9
Tubing Stretch Graphs	10 - 16
Casing Stretch Graphs	17 - 20
Set-Down and Slack Off Weights	21
Slack Off Graphs	22 - 27
Drill Pipe Stretch Graphs	28 - 32
Buoyancy Factor	33 - 34

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TUBING, DRILL PIPE, AND CASING STRETCH DATA

The stretch or elongation of oil well tubular material resulting from an applied pulling force is a commonly required determination. Robert Hooke (1635 - 1702), discovered the law (Hooke's Law) that strain or distortion is proportional to stress or force if the elastic limit of the material is no exceeded. (The elastic limit of a material is the maximum stress that can be developed within it without causing permanent deformation, or permanent stretch in oil field terms.)

The amount of stretch that will occur when a pull force is applied varies with the amount of pull, the length of material being stretched, the elasticity of the material, and its cross-sectional area, as given in the general stretch formula that follows, provided the elastic limit is not exceeded.

General Stretch Formula:

$$\Delta L = \frac{F \times L \times 12}{E \times a_s}$$

Where ΔL = stretch, in inches
F = pull force, in pounds
L = length, in feet
E = modulus of elasticity, in pounds per square inch (for steel, E = 30,000,000 psi)
a_s = cross-sectional area (wall area or O.D. area minus I.D. area for tubular material), in square inches.

Note:
It is a common misconception that the rate of stretch for oil field tubular material also is affected by the grade of steel (J-55, N-80, etc.). This is not true.

Higher grades of steel have greater elastic limits and can therefore be stretched farther before reaching their elastic limits that can the lower grades, but the rate of stretch is the same for all grades. The only factors that affect the rate of stretch are those shown in the preceding general stretch formula.

Stretch Tables:
Stretch tables in this section (Pages 16-6 through 16-10) cover a wide range of sizes and weights of tubing, drill pipe, and casing.
Columnar tabulations in the tables show outside diameter weight per foot, inside diameter, pipe wall cross-sectional area, Stretch Constant (S.C.) and Free Point Constant (F.P.C.)

Determining Stretch:
Amount of stretch is determined by using the correct Stretch Constant from the tables in the following formula:

$$\Delta L = F \times L \times S.C.$$

Where ΔL = stretch, in inches
F = pull force, in thousands of pounds
L = length, in thousands of feet
S.C = charted Stretch Constant, in inches of stretch per thousand pounds of pull per thousand feet of length.

Example:
Determine the amount of stretch for 30,000 pounds of pull on 6,500 feet of 2.375 O.D., 4.7 lb/ft. 1.995 I.D. tubing.

$\Delta L = F \times L \times S.C.$
$= 30 \times 6.5 \times 0.30675$
$= 59.8$ inches of stretch

Determining Free Point:
The charted Free Point Constant makes it possible to determine very easily the length of pipe being stretched, commonly referred to as determining the free point in

Continued on page 16-2

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a string of stuck or anchored pipe, when the amount of pull force and amount of stretch are known. Read the correct Free Point Constant from the chart for the pipe involved, and use in the following formula:

$$L = \frac{\Delta L \times F.P.C.}{F}$$

Where: L = *minimum length of free pipe, or length being stretched, in feet.
ΔL = stretch, in inches
F = pull force, in thousands of pounds
F.P.C. = charted Free Point Constant

* Because of friction forces, which cannot be determined readily, the actual length of free pipe may be longer than calculated. The formula necessarily assumes complete absence of friction.

Example:
Determine the minimum length of free pipe being stretched when a string of 4-1/2 O.D., 16.60 lb/ft drill pipe stretches 18.6 inches with an applied pull of 25,000 pounds.

$$L = \frac{\Delta L \times F.P.C.}{F}$$
$$= \frac{18.6 \times 11.017.5}{25}$$
$$= 8.197 \text{ feet, or approximately } 8,200 \text{ feet}$$

Calculation of Stretch Constants and Free Point Constants:
For any pipe sizes not included in the tabulated stretch chart data, Stretch Constants and Free Point Constants can be calculated as follows:

$$S.C. = \frac{0.4}{a_s}$$
$$F.P.C. = 2500 \times a_s$$

Where:
a_s = pipe wall cross-sectional area, in square inches.

Example:
Determine the Stretch Constant for 2.375 O.D., 4.7 lb/ft tubing which has a pipe wall cross-sectional area (a_s) of 1.304 square inches.

$$S.C. = \frac{0.4}{a_s}$$
$$= \frac{0.4}{1.304}$$
$$= 0.30675$$

Example:
Determine the Free Point Constant for 4-1/2 O.D., 16.60 lb/ft drill pipe which has a pipe wall cross-sectional area (a_s) of 4.407 square inches.

$$F.P.C. = 2500 \times a_s$$
$$= 2500 \times 4.407$$
$$= 11,017.5$$

Stretch Graphs
Stretch graphs are included in this section (Pages 16 - 11 through 16-23) for 1.660 through 7 O.D. external upset or non-upset API tubing in the most common weight and wall thickness for each size. For tubing having any other cross-sectional wall area, stretch must be determined from the general stretch formula or from the stretch charts also included in this section.

Each stretch graph involves only three variables: amount of pull force, depth (or length), and amount of stretch. When any two of the variables are known, the third can be read directly from the graph as follows:
1. if **depth** and **pull force** are known, the amount of stretch can be found.
2. If **depth** and **stretch** are known, the amount of pull can be found.
3. If **pull force** and **stretch** are known, the depth or length of tubing being stretched can be found.

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TUBING STRETCH TABLE

O.D. (in.)	Weight (lb/ft)	I.D. (in.)	Wall Area (sq. in.)	Stretch Constant (in./1000lb /1000ft)	Free Point Constant
1.050 (3/4)	1.14	0.824	0.333	1.20120	832.5
	1.20	0.824	0.333	1.20120	832.5
1.315 (1)	1.30	1.125	0.364	1.09890	910.0
	1.43	1.097	0.413	0.96852	1032.5
	1.63	1.065	0.467	0.85653	1167.5
	1.70	1.049	0.494	0.80972	1235.0
	1.72	1.049	0.494	0.80972	1235.0
	1.80	1.049	0.494	0.80972	1235.0
1.660 (1-1/4)	2.10	1.410	0.603	0.66335	1507.5
	2.30	1.380	0.669	0.59791	1672.5
	2.33	1.380	0.669	0.59791	1672.5
	2.40	1.380	0.669	0.59791	1672.5
1.900 (1-1/2)	2.40	1.650	0.697	0.57389	1742.5
	2.60	1.610	0.799	0.50063	1997.5
	2.72	1.610	0.799	0.50063	1997.5
	2.75	1.610	0.799	0.50063	1997.5
	2.76	1.610	0.799	0.50063	1997.5
	2.90	1.610	0.799	0.50063	1997.5
2.000 (2)	3.30	1.670	0.951	0.42061	2377.5
	3.40	1.670	0.951	0.42061	2377.5
2.063 (2-1/16)	2.66	1.813	0.761	0.52562	1902.5
	3.25	1.751	0.935	0.42781	2337.5
	3.30	1.751	0.935	0.42781	2337.5
	3.40	1.751	0.935	0.42781	2337.5
2.375 (2-3/8)	3.10	2.125	0.884	0.45249	2210.0
	3.32	2.107	0.943	0.42418	2357.5
	4.00	2.041	1.158	0.34542	2895.0
	4.60	1.995	1.304	0.30675	3260.0
	4.70	1.995	1.304	0.30675	3260.0
	5.30	1.939	1.477	0.27082	3692.5
	5.80	1.867	1.692	0.23641	4230.0
	5.95	1.867	1.692	0.23641	4230.0
	6.20	1.853	1.733	0.23081	4332.0
	7.70	1.703	2.152	0.18587	5380.0

Continued on page 16-4

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TUBING STRETCH TABLE

OD (in.)	Weight (lb/ft)	ID (in.)	Wall Area (sq. in.)	Stretch Constant (in./1000 lb /1000 ft)	Free Point Constant
2.875 (2-7/8)	4.36	2.579	1.268	0.31546	3170.0
	4.64	2.563	1.333	0.30008	3332.5
	6.40	2.441	1.812	0.22075	4530.0
	6.50	2.441	1.812	0.22075	4530.0
	7.90	2.323	2.254	0.17746	5635.0
	8.60	2.259	2.484	0.16103	6210.0
	8.70	2.259	2.484	0.16103	6210.0
	8.90	2.243	2.540	0.15748	6350.0
	9.50	2.195	2.708	0.14771	6770.0
	10.40	2.151	2.858	0.13996	7145.0
	11.00	2.065	3.143	0.12727	7857.5
	11.65	1.995	3.366	0.11884	8415.0
3.500 (3-1/2)	5.63*	3.188	1.639	0.24405	4097.5
	5.75	3.188	1.639	0.24405	4097.5
	7.70	3.068	2.228	0.17953	5570.0
	9.20	2.922	2.590	0.15444	6475.0
	9.30	2.922	2.590	0.15444	6475.0
	10.20	2.922	2.915	0.13722	7287.5
	10.30	2.922	2.915	0.13722	7287.5
	12.80	2.764	3.621	0.11047	9052.5
	12.95	2.750	3.682	0.10864	9205.0
	13.70	2.673	4.010	0.09975	10025.0
	14.70	2.601	4.308	0.09285	10770.0
	15.10	2.602	4.304	0.09294	10760.0
	15.80	2.524	4.618	0.08662	11545.0
	17.05	2.440	4.945	0.08089	12362.5
4.00 (4)	9.40	3.548	2.680	0.14925	6700.0
	9.50	3.548	2.680	0.14925	6700.0
	10.80	3.476	3.077	0.13000	7692.5
	10.90	3.476	3.077	0.13000	7692.5
	11.00	3.476	3.077	0.13000	7692.5
	11.60	3.428	3.337	0.11987	8342.5
	13.40	3.340	3.805	0.10512	9512.5
4.500 (4-1/2)	12.60	3.958	3.600	0.11111	9000.0
	12.75	3.958	3.600	0.11111	9000.0
	15.10	3.826	4.407	0.09076	11017.5
	15.50	3.826	4.407	0.09076	11017.5
	16.90	3.754	4.836	0.08271	12090.0
	19.20	3.640	5.498	0.07275	13745.0

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DRILL PIPE STRETCH TABLE

O.D. (in.)	Nominal Weight (lb/ft)	I.D. (in.)	Wall Area (sq. in.)	Stretch Constant (in./1000lb /1000ft)	Free Point Constant
(2-3/8	4.85 6.65	1.995 1.815	1.304 1.843	0.30675 0.21704	3260.0 4607.5
(2-7/8)	6.85 10.40	2.441 2.151	1.812 2.858	0.22075 0.13996	4530.0 7145.0
(3-1/2)	9.50 13.30 15.50	2.992 2.764 2.602	2.590 3.621 4.304	0.15444 0.11047 0.09294	6475.0 9052.5 10760.0
(4)	11.85 14.00	3.476 3.340	3.077 3.805	0.13000 0.10512	7692.5 9512.5
(4-1/2)	13.75 16.60 18.10 20.00	3.958 3.826 3.754 3.640	3.600 4.407 4.836 5.498	0.11111 0.09076 0.08271 0.07275	9000.0 11017.5 12090.0 13745.0
(5)	16.25 19.50	4.408 4.276	4.374 5.275	0.09145 0.07583	10935.0 13187.5
(5-1/2)	21.90 24.70	4.778 4.670	5.828 6.630	0.06863 0.06033	14570.0 16575.0
(6-5/8)	25.20	5.965	6.526	0.06129	16315.0

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CASING STRETCH TABLE

O.D. (in.)	Weight (lb/ft)	I.D. (in.)	Wall Area (sq. in.)	Stretch Constant (in/1000lb /1000ft)	Free Point Constant
(4-1/2)	95.0	4.090	2.766	0.14461	6915.0
	10.50	4.052	3.009	0.13293	7522.5
	11.60	4.000	3.338	0.11983	8345.0
	13.50	3.920	3.836	0.10428	9590.0
	15.10	3.826	4.407	0.09076	11017.5
	16.90	3.740	4.918	0.08133	12295.0
(5)	11.50	4.560	3.304	0.12107	8260.0
	13.00	4.494	3.773	0.10602	9432.5
	15.00	4.408	4.374	0.09145	10935.0
	18.00	4.276	5.275	0.07583	13187.5
	20.80	4.156	6.069	0.06591	15172.5
(5-1/2)	14.00	5.012	4.029	0.09928	10072.5
	15.50	4.950	4.514	0.08861	11285.0
	17.00	4.892	4.962	0.08061	12405.0
	20.00	4.778	5.828	0.06863	14570.0
	23.00	4.670	6.630	0.06033	16575.0
(6-5/8)	20.00	6.049	5.734	0.06976	14335.0
	24.00	5.921	6.937	0.05766	17342.5
	28.00	5.791	8.133	0.04918	20332.5
	32.00	5.675	9.177	0.04359	22942.5
(7)	17.00	6.538	4.912	0.08143	12280.0
	20.00	6.456	5.749	0.06958	14372.5
	23.00	6.366	6.656	0.06010	16640.0
	26.00	6.276	7.549	0.05299	18872.5
	29.00	6.184	8.449	0.04734	21122.5
	32.00	6.094	9.317	0.04293	23292.5
	35.00	6.004	10.172	0.03932	25430.0
	38.00	5.920	10.959	0.03650	27397.5
(7-5/8)	24.00	7.025	6.904	0.05794	17260.0
	26.40	6.969	7.519	0.05320	18797.5
	29.70	6.875	8.541	0.04683	21352.5
	33.70	6.765	9.720	0.04115	24300.0
	39.00	6.625	11.191	0.03574	27980.0

Continued on page 16-7

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CASING STRETCH TABLE CONTINUED

OD (in.)	Weight (lb/ft)	ID (in.)	Wall Area (sq. in.)	Stretch Constant (in./100 lb /1000 ft)	Free Point Constant
(8-5/8)	24.00	8.097	6.934	0.05769	17335.0
	28.00	8.017	7.947	0.05033	19867.5
	32.00	7.921	9.149	0.04372	22872.5
	36.00	7.825	10.336	0.03870	25840.0
	40.00	7.725	11.557	0.03461	28892.5
	44.00	7.625	12.673	0.03156	31682.5
	49.00	7.511	14.118	0.02833	35295.0
(9-5/8)	32.30	9.001	9.128	0.04382	22820.0
	36.00	8.921	10.254	0.03901	25635.0
	40.00	8.835	11.454	0.03492	28635.0
	43.50	8.755	12.559	0.03185	31397.5
	47.00	8.681	13.572	0.02947	33930.0
	53.50	8.535	15.546	0.02573	38865.0
(10-3/4)	32.75	10.192	9.178	0.04358	22945.0
	40.50	10.050	11.435	0.03498	28587.5
	45.50	9.950	13.006	0.03076	32515.0
	51.00	9.850	14.561	0.02747	36402.5
	55.50	9.760	15.947	0.02508	39867.5
	60.70	9.660	17.473	0.02289	43682.5
	65.70	9.560	18.982	0.02107	47455.0
(11-3/4)	42.00	11.084	11.944	0.03349	29860.0
	47.00	11.000	13.401	0.02985	33502.5
	54.00	10.880	15.463	0.02587	38657.5
	60.00	10.772	17.300	0.02312	43250.0
(13-3/8)	48.00	12.715	13.524	0.02958	33810.0
	54.50	12.615	15.514	0.02578	38785.0
	61.00	12.515	17.487	0.02287	43717.5
	68.00	12.415	19.445	0.02057	48612.5
	72.00	12.347	20.768	0.01926	51920.0
(16)	65.00	15.250	18.408	0.02173	46020.0
	75.00	15.124	21.414	0.01868	53535.0
	84.00	15.010	24.112	0.01659	60280.0
(20)	94.00	19.124	26.918	0.01468	67295.0

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PIPE RECOVERY

Stretch readings to obtain an estimated free point are very important for several reasons. A stretch reading should be one of the first steps performed on a pipe recovery job.

The reasons for this are:

(1) To speed up the job. If your estimated free point is at 10,000', then there is no reason to waste time taking readings at shallow depths. You need only to set the tool up and then drop down and start your reading a few hundred feet above this point.

(2) To determine the size string shot to run.

(3) To determine the type fuses and prima cord to use to construct the shot.

(4) To determine the weights and torque needed to properly run a free point.

Method 1

In order to obtain an estimated free point; figure the weight of the string, including block. Pick the pipe up to this weight. make a mark on the pipe at the rotary table. Then pull the number of pounds above this, taken from the following chart. Make another mark at the rotary table. Measure the distance between the two marks. This will give you 3-1/2" of stretch per 1,000' of free pipe. Number of inches of stretch 3.5" x 1,000'.

Weight to pull above string weight to obtain 3-1/2" of stretch per 1,000' of free pipe.

PIPE SIZE				REQUIRED PULL	
Inches	mm	Lbs./Ft.	Kg/M	Pounds	daN
1	25.4 Tbg	1.80	2.68	4,500	1,990
1-1/4	31.7	2.40	3.57	6,000	2,600
1-1/2	38.1	2.90	4.31	7,000	3,100
2-3/8	60.3	4.70	6.99	11,500	5,100
2-3/8	60.3	7.70	11.46	19,000	8,500
2-7/8	73.0	6.50	9.67	15,500	7,000
2-7/8	73.0	10.40	15.58	25,000	11,000
3-1/2	88.9	9.30	13.84	22,500	10,000
3-1/2	88.9	10.30	15.33	25,500	11,500
3-1/2	88.9	12.95	19.27	32,000	14,500
3-1/2	88.9	15.80	23.51	40,500	18,000
4	101.6	11.00	16.37	27,000	12,000
4	101.6	13.40	19.94	33,500	15,000
4-1/2	114.3	12.75	18.97	31,500	14,000
2-3/8	60.3 DP	6.65	9.89	16,000	7,000
2-7/8	73.0	10.40	15.47	25,000	11,000
3-1/2	88.9	13.30	19.79	31,500	14,000
4	101.6	14.00	20.83	33,500	15,000
4-1/2	114.3	16.60	24.70	38,500	17,000
5	127.0	19.50	29.02	46,000	20,500
4-1/2	114.3 Csg	9.50	14.14	24,000	10,500
4-1/2	114.3	11.60	17.26	29,000	13,000
5	127.0	15.00	22.32	38,500	17,000
5-1/2	139.7	14.00	20.83	35,500	15,500
5-1/2	139.7	17.00	25.30	43,500	19,500
5-1/2	139.7	20.00	29.76	51,000	22,500
7	177.8	17.00	25.30	43,000	19,000
7	177.8	23.00	34.22	58,000	26,000
7	177.8	35.00	52.08	89,000	39,500
8-5/8	219.0	40.00	59.52	101,000	45,000
9-5/8	244.5	43.50	64.73	110,000	49,000
10-3/4	273.0	45.50	67.70	114,000	50,500

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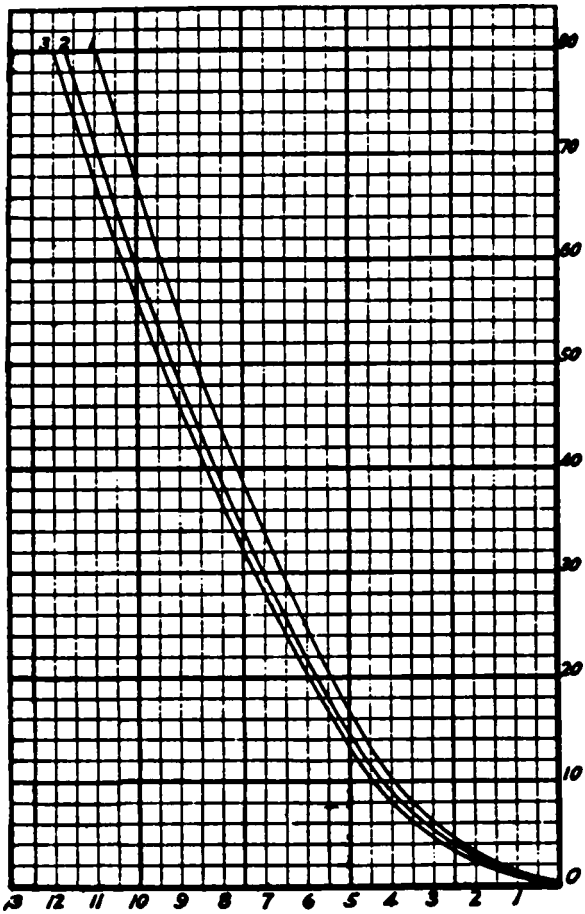
ELONGATION OF PIPE & RODS



CURVES
1 = Air
2 = Salt Water (sp. gr. 1.155)
3 = Drilling mud (sp. gr. 1.45)
Curves represent elongation of Drill Pipe, Tubing or Sucker Rods.

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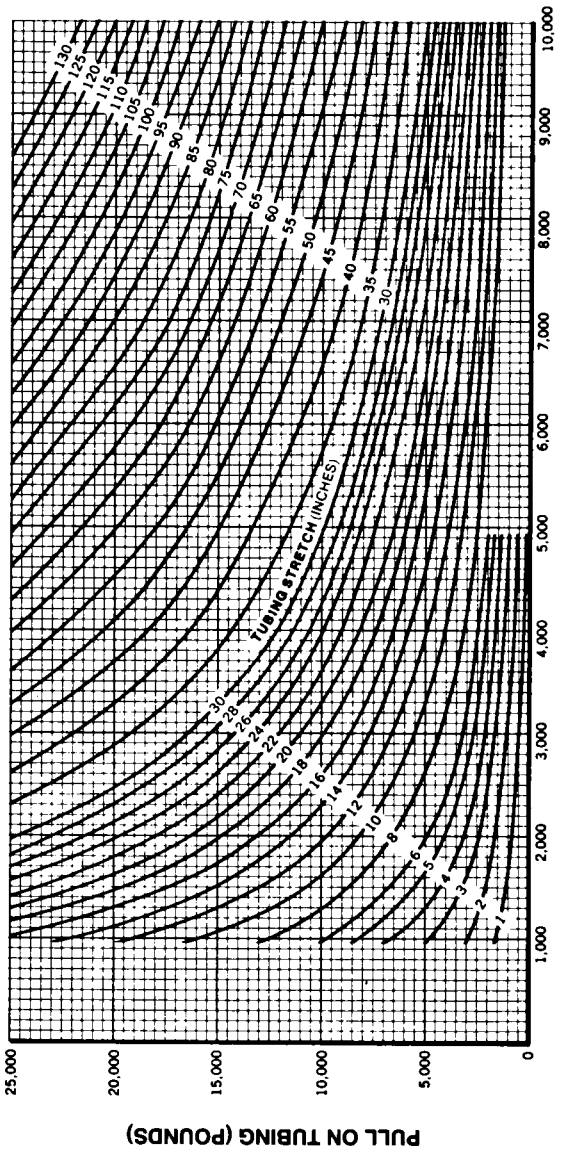
TUBING STRETCH GRAPH
1.660 OD 2.40 LB/FT EU OR 2.30 LB/FT NU (.668 SQ IN. WALL AREA) API TUBING



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TUBING STRETCH GRAPH
1.900 OD 2.90 LB/FT EU OR 2.75 LB/FT NU (.800 SQ IN. WALL AREA) API TUBING

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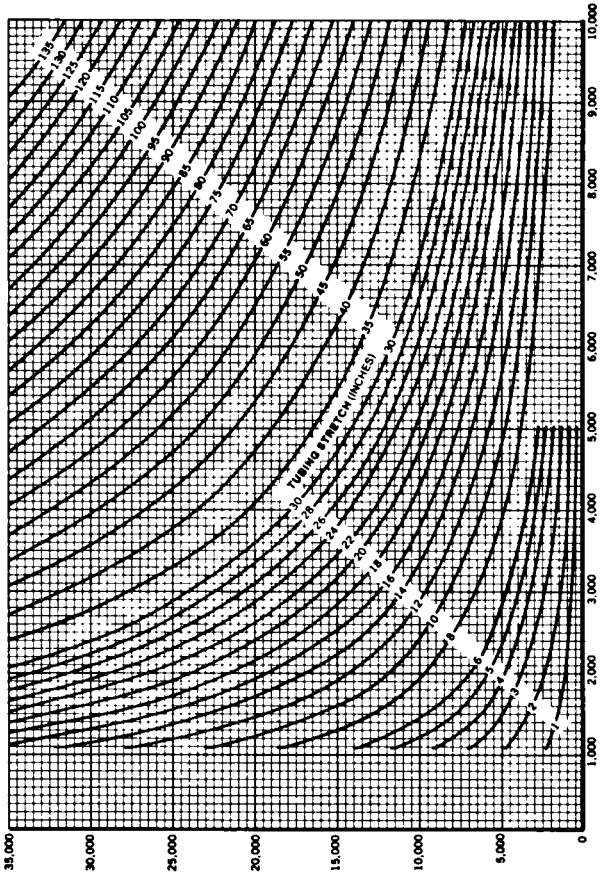
TUBING STRETCH GRAPH
2.063 OD 3.25 LB/FT INTEGRAL JOINT (.934 SQ IN. WALL AREA) API TUBING



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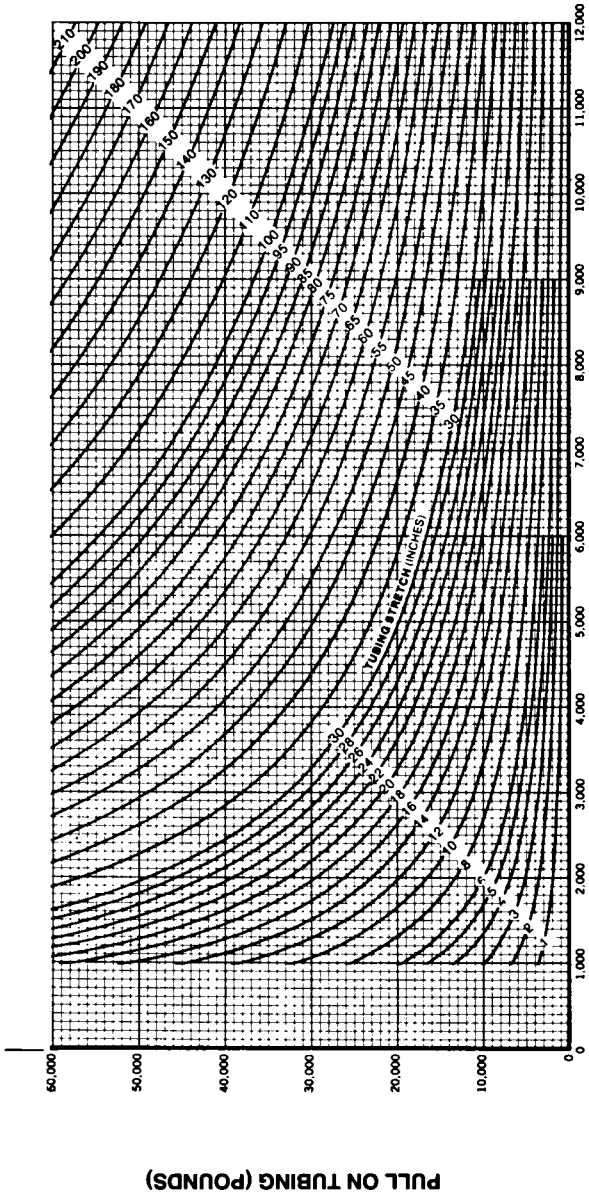
TUBING STRETCH GRAPH
2.375 OD 4.7 LB/FT EU OR 4.6 LB/FT NU (1.304 SQ IN. WALL AREA) API TUBING



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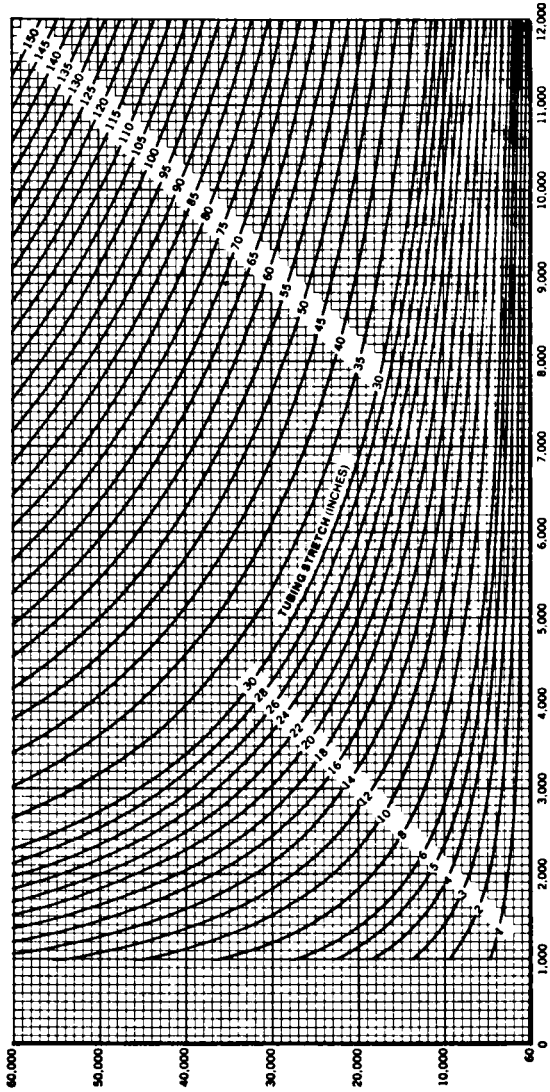
TUBING STRETCH GRAPH
2.875 OD 6.5 LB/FT EU OR 6.4 LB/FT NU (1.812 SQ IN. WALL AREA) API TUBING



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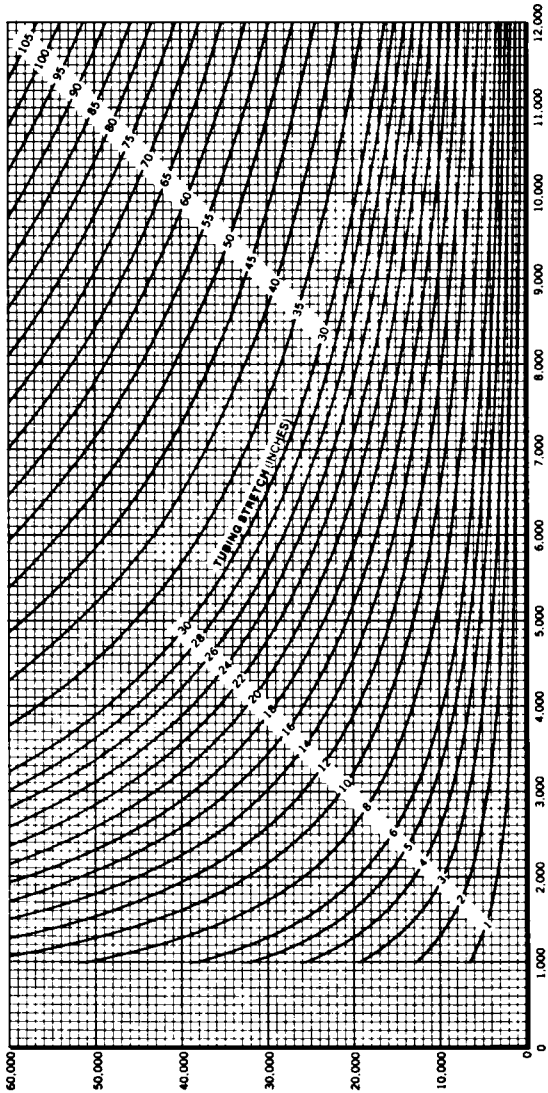
TUBING STRETCH GRAPH
3.500 OD 9.30 LB/FT EU OR 9.2 LB/FT NU (2.590 SQ IN. WALL AREA) API TUBING



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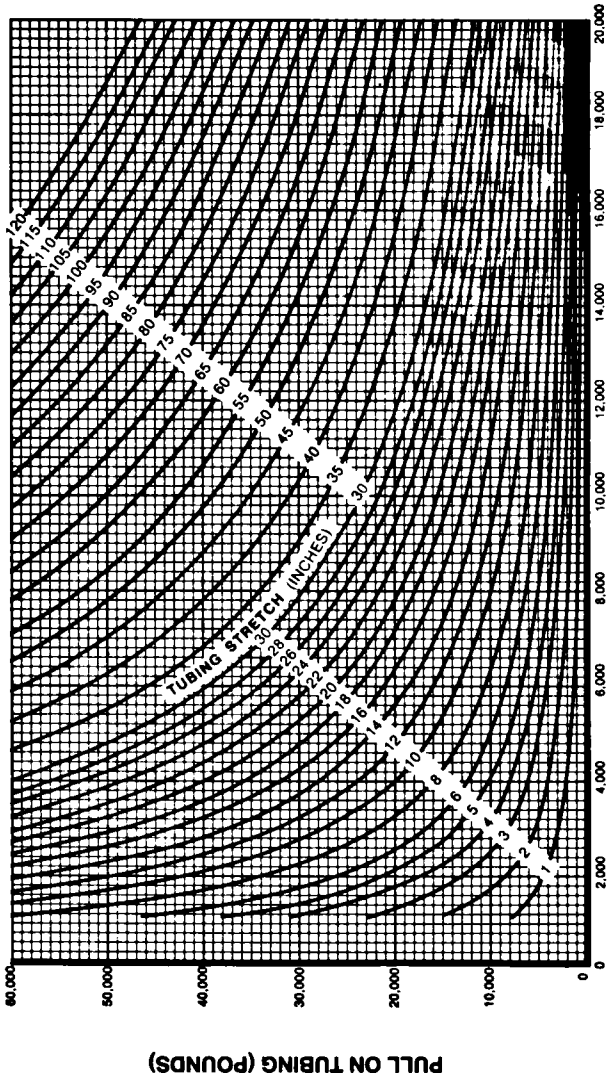
TUBING STRETCH GRAPH
4.000 OD 10.9 LB/FT API TUBING



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CASING STRETCH GRAPH
4.500 OD 13.5 LB/FT CASING

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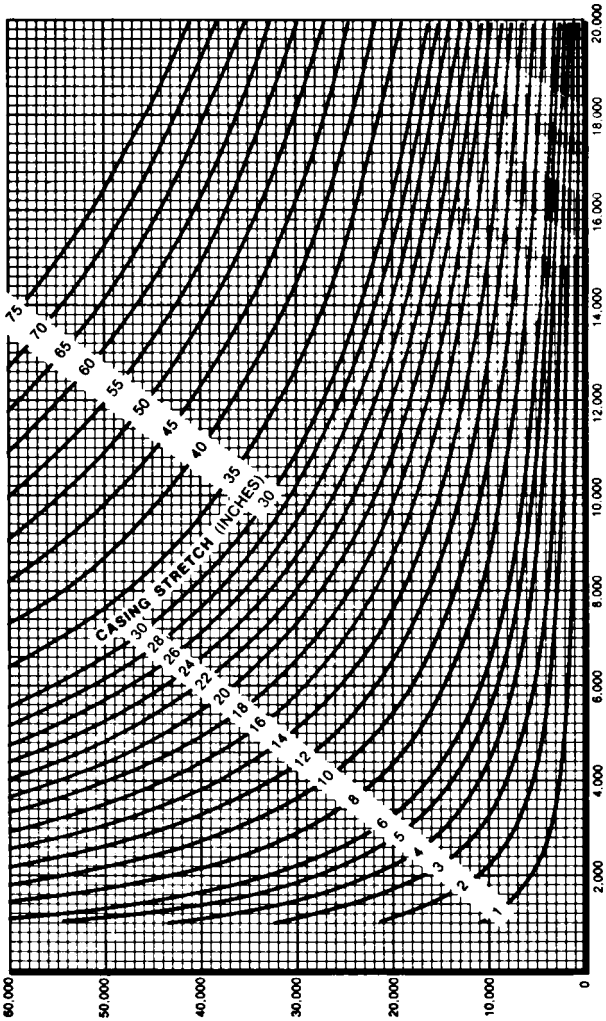
CASING STRETCH GRAPH
5.000 OD 15.0 LB/FT CASING



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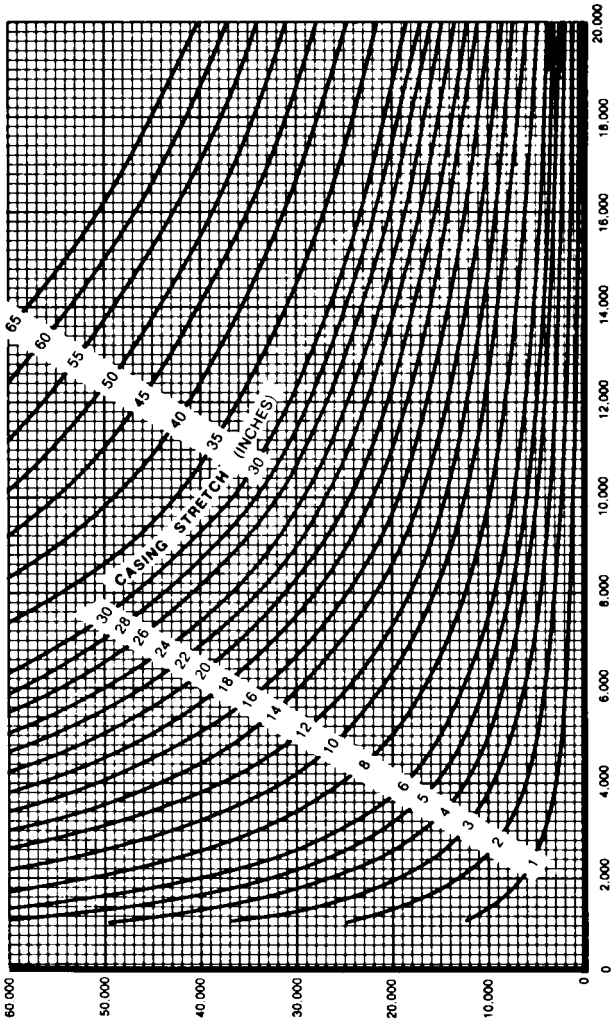
CASING STRETCH GRAPH
5.500 OD 17.0 LB/FT CASING



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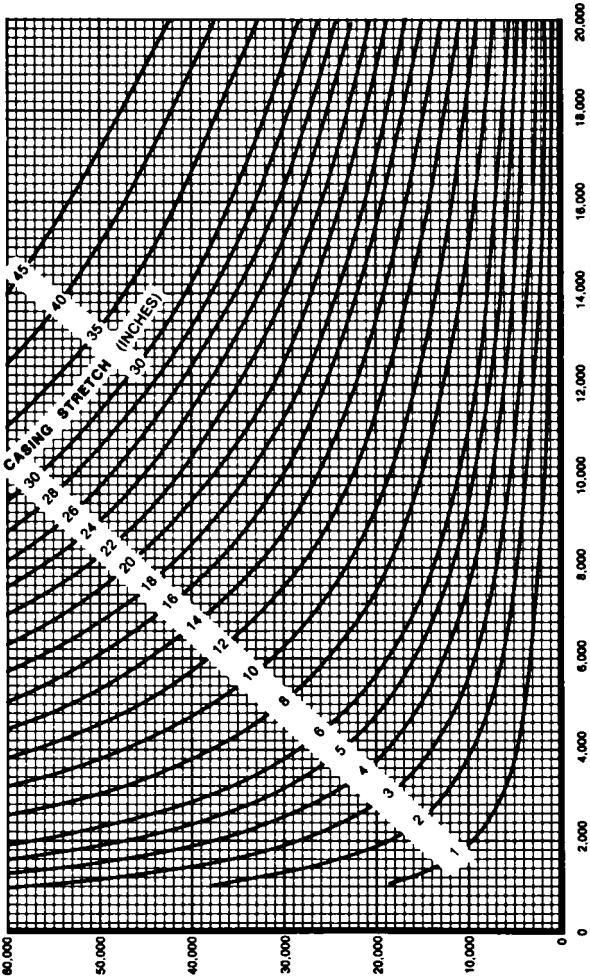
CASING STRETCH GRAPH
7.000 OD 26.0 LB/FT CASING



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SET-DOWN AND SLACK OFF WEIGHTS

When a string of tubing is lowered to put weight on bottom, as in setting a packer, the tubing buckles in the form of a helix and a significant amount of the applied weight is supported by friction between the tubing and casing. The accompanying slack off graphs (Pages 1-23 through 1-28) indicate the magnitude of the effect of friction and provide a means of determining the approximate amount of weight applied on bottom as the tubing is lowered and the weight loss is measured at the surface. Graphs are provided for most common tubing/casing combinations.

The graphs were developed from mathematical calculations using an assumed average value for the coefficient of friction. They are presented for information and may not be exactly accurate for any specific case because of the possibility that the coefficient of friction actually involved may vary form the assumed value: however, actual tests run in a variety of well fluids indicate that variations are relatively small.

In situations where the amount of effective tubing weight on bottom may be marginal or inadequate to completely pack off a set-down type packer, it is suggested that an attempt be made to pressure the casing. Pressure in the casing/tubing annulus tends to straighten the tubing and put more weight on the packer. Casing pressure will also increase the pack off force in the packing element of a partially packed off set-down type packer.

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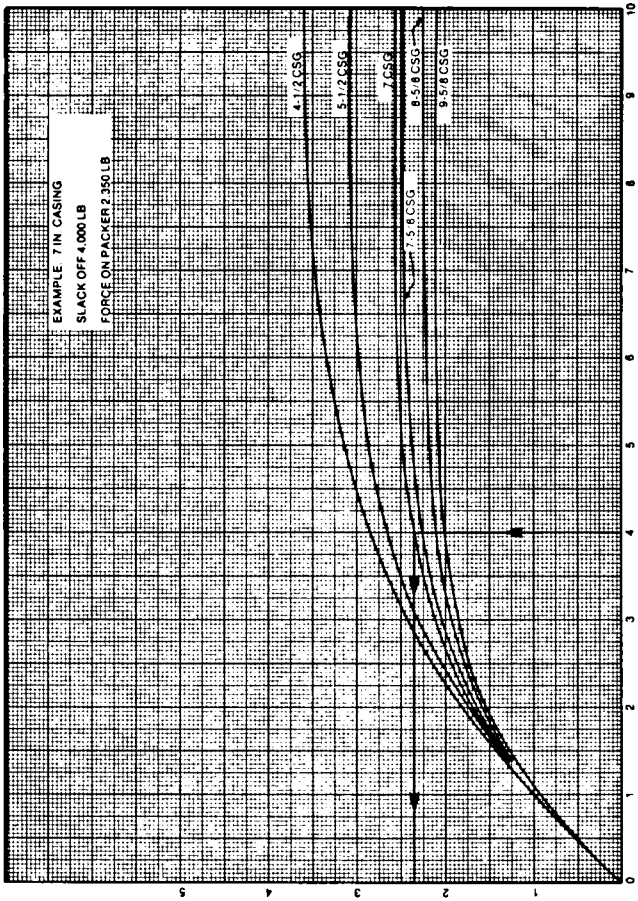
SLACK OFF GRAPH — 1.660 OD TUBING



SLACK OFF FORCE (THOUSANDS OF POUNDS)

FORCE ON PACKER (THOUSANDS OF POUNDS)

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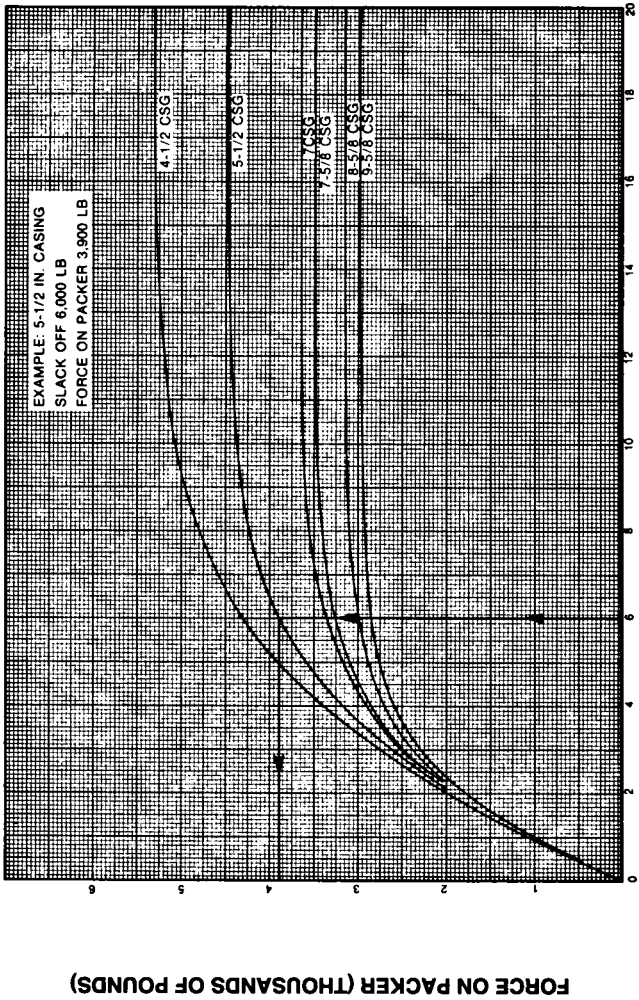
SLACK OFF GRAPH — 1.900 OD TUBING



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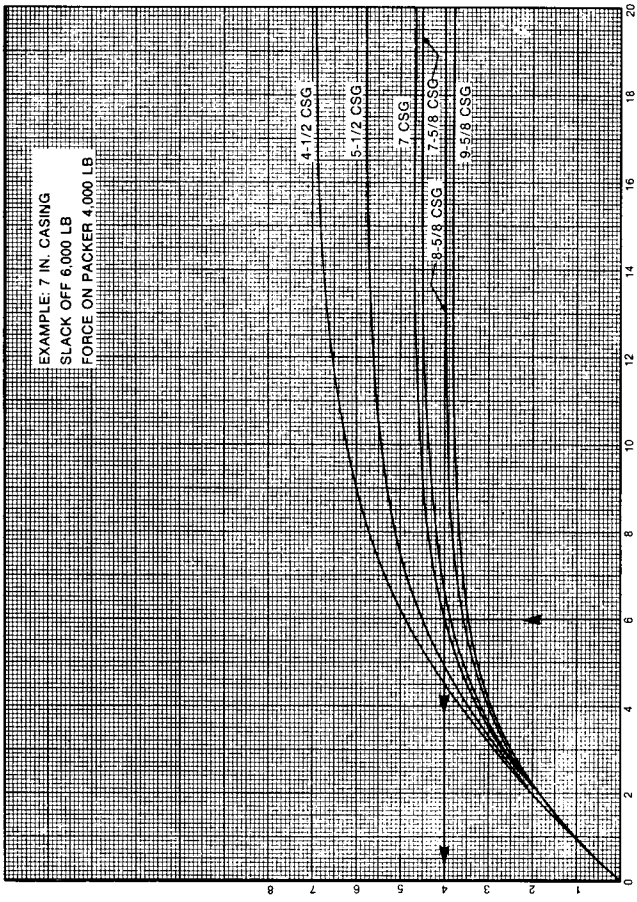
SLACK OFF GRAPH — 2.062 OD TUBING



SLACK OFF FORCE (THOUSANDS OF POUNDS)

FORCE ON PACKER (THOUSANDS OF POUNDS)

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SLACK OFF GRAPH — 2.375 OD TUBING

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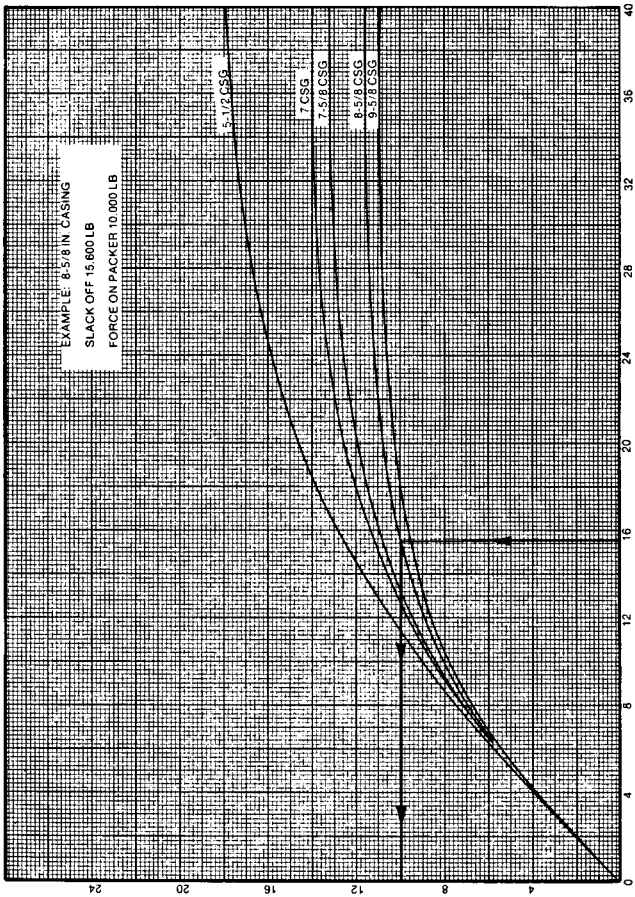
SLACK OFF GRAPH — 2.875 OD TUBING



SLACK OFF FORCE (THOUSANDS OF POUNDS)

FORCE ON PACKER (THOUSANDS OF POUNDS)

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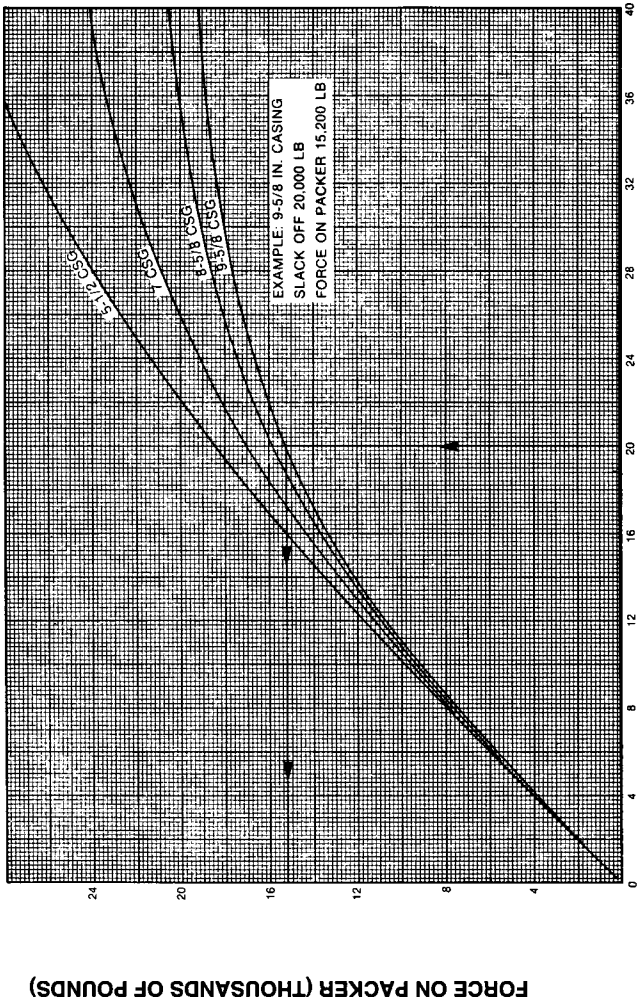
SLACK OFF GRAPH — 3.500 OD TUBING



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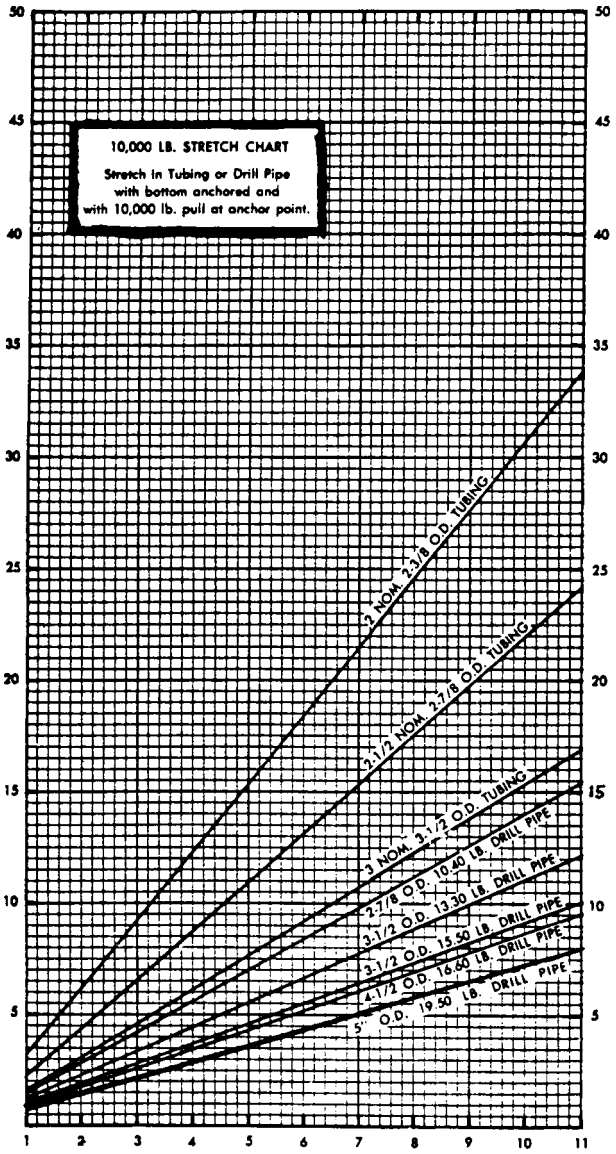
10,000 LB. STRETCH CHART



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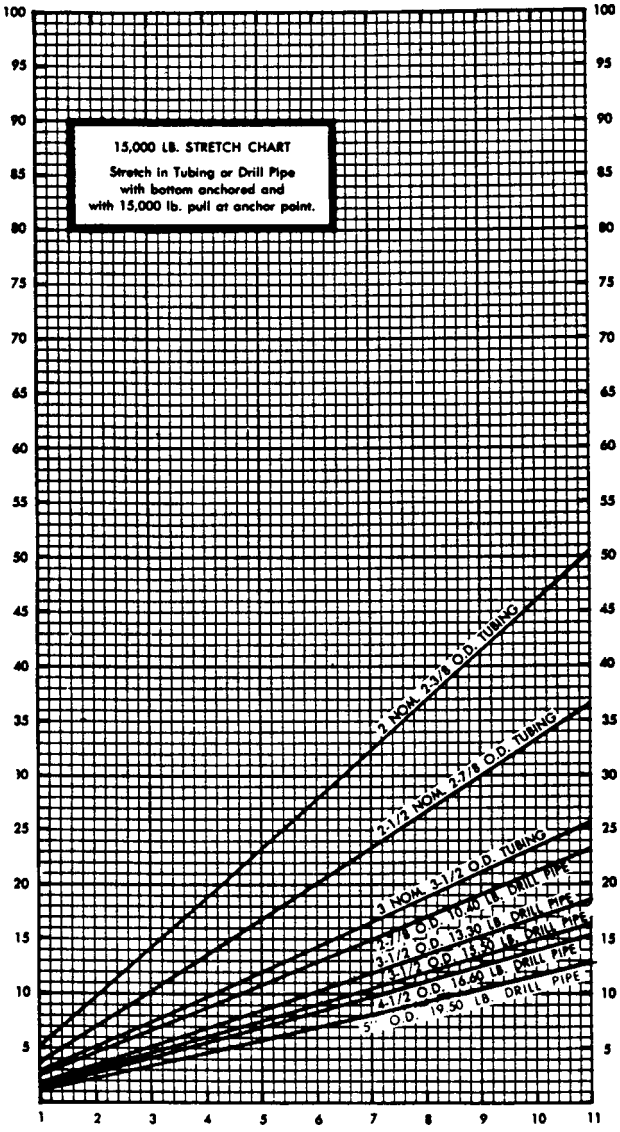
15,000 LB. STRETCH CHART


15,000 LB. STRETCH CHART
Stretch in Tubing or Drill Pipe
with bottom anchored and
with 15,000 lb. pull at anchor point.
2 NOM. 2-3/8 O.D. TUBING
2-1/2 NOM. 2-7/8 O.D. TUBING
3 NOM. 3-1/2 O.D. TUBING
3-1/2 O.D. 10.20 LB. DRILL PIPE
3-1/2 O.D. 13.30 LB. DRILL PIPE
4 1/2 O.D. 13.75 LB. DRILL PIPE
4-1/2 O.D. 16.60 LB. DRILL PIPE
4-1/2 O.D. 19.50 LB. DRILL PIPE
5" O.D. 19.50 LB. DRILL PIPE
STRETCH IN INCHES
LENGTH IN FEET X 1,000

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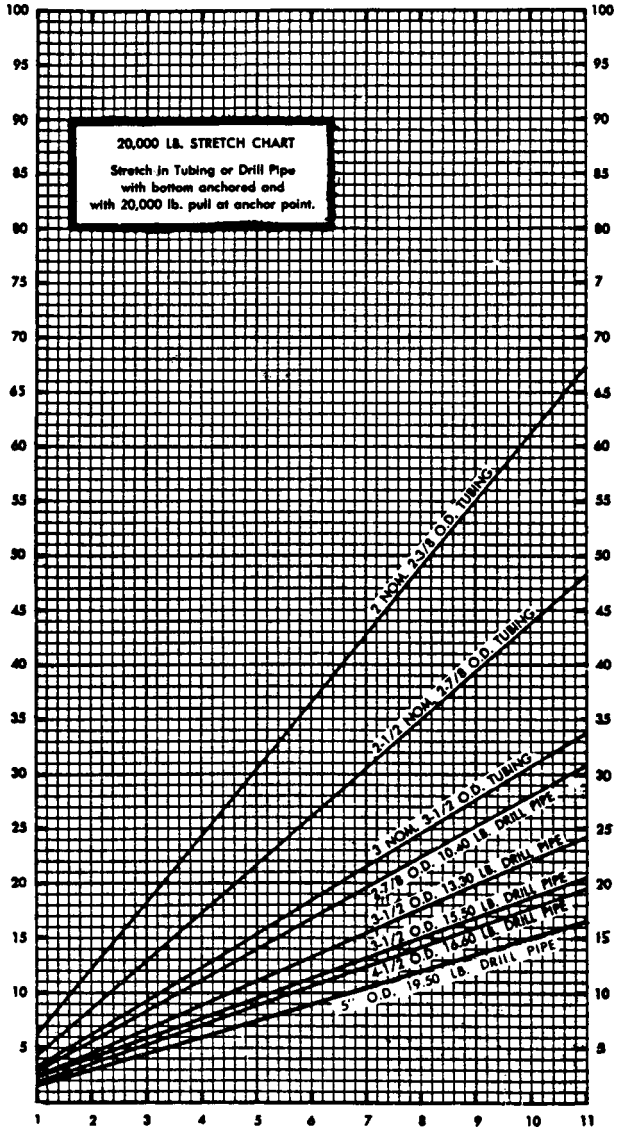
20,000 LB. STRETCH CHART


20,000 LB. STRETCH CHART
Stretch in Tubing or Drill Pipe with bottom anchored and with 20,000 lb. pull at anchor point.
2 NOM. 1.9/8 O.D. TUBING
2.1/2 NOM. 2.3/8 O.D. TUBING
3 NOM. 2.1/2 O.D. TUBING
2.3/8 O.D. 10.40 LB. DRILL PIPE
2.7/8 O.D. 13.30 LB. DRILL PIPE
3.1/2 O.D. 15.50 LB. DRILL PIPE
4.1/2 O.D. 16.60 LB. DRILL PIPE
5" O.D. 19.50 LB. DRILL PIPE
STRETCH IN INCHES
LENGTH IN FEET X 1,000

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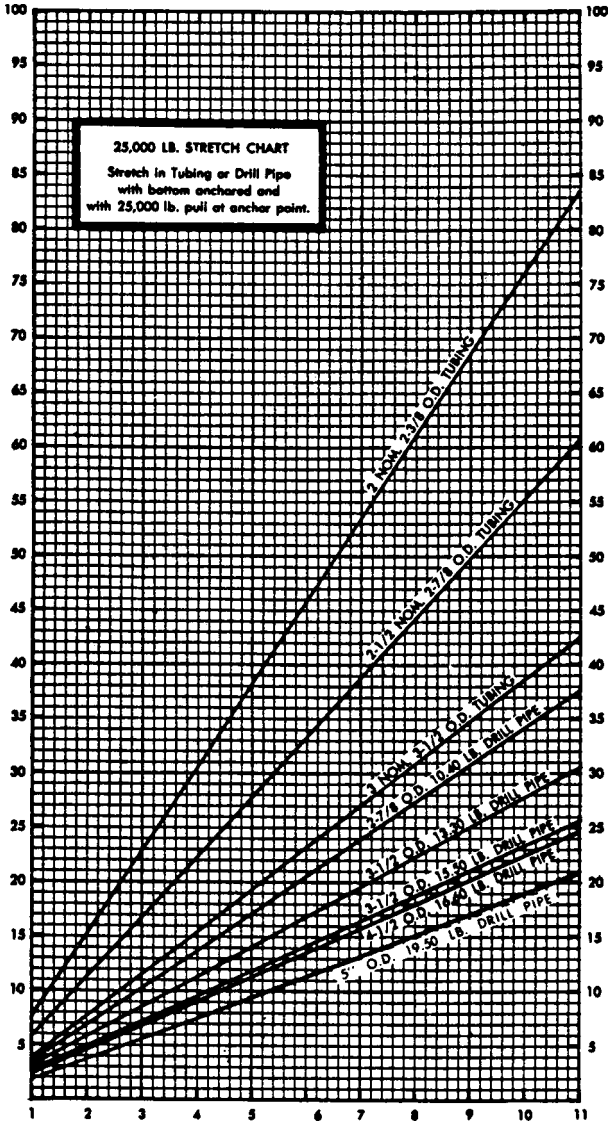
25,000 LB. STRETCH CHART


25,000 LB. STRETCH CHART
Stretch in Tubing or Drill Pipe with bottom anchored and with 25,000 lb. pull at anchor point.
2 NOM. 2.3/8 O.D. TUBING
2.1/2 NOM. 2.7/8 O.D. TUBING
3 NOM. 3.1/2 O.D. TUBING
2.7/8 O.D. 10.40 LB. DRILL PIPE
3.1/2 O.D. 13.30 LB. DRILL PIPE
3.1/2 O.D. 15.50 LB. DRILL PIPE
4.1/2 O.D. 16.60 LB. DRILL PIPE
5" O.D. 19.50 LB. DRILL PIPE
STRETCH IN INCHES
LENGTH IN FEET X 1,000

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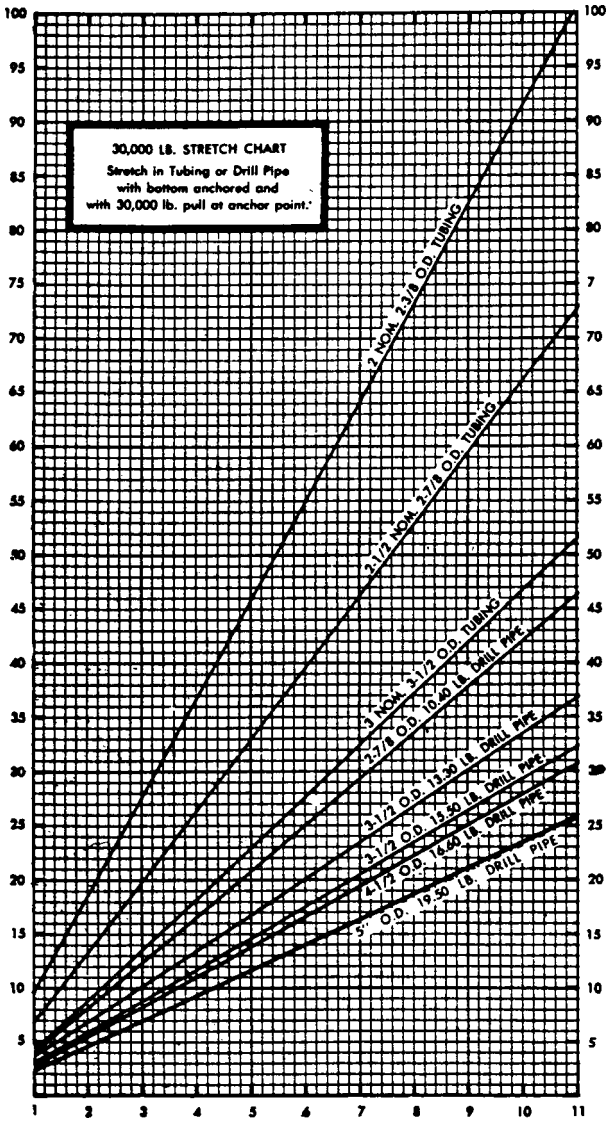
30,000 LB. STRETCH CHART



STRETCH IN INCHES

LENGTH IN FEET X 1,000

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BUOYANCY FACTOR

MUD WT. LB./GAL.	
8.4	.872
8.6	.869
8.8	.866
9.0	.862
9.2	.859
9.4	.856
9.6	.853
9.8	.850
10.0	.847
10.2	.844
10.4	.841
10.6	.838
10.8	.835
11.0	.832
11.2	.829
11.4	.826
11.6	.823
11.8	.820
12.0	.817
12.2	.814
12.4	.811
12.6	.807
12.8	.804
13.0	.801
13.2	.798
13.4	.795
13.6	.792
13.8	.789
14.0	.786
14.5	.778
15.0	.771
15.5	.763
16.0	.756
16.5	.748
17.0	.740
17.5	.733
18.0	.725
18.5	.717
19.0	.710
19.5	.702
20.0	.694

$$\text{Buoyancy Factor} = 1 - \frac{\text{Mud Weight}}{65.63}$$

Hydrostatic Pressure (psi)= Depth (ft) x Fluid Weight x .052

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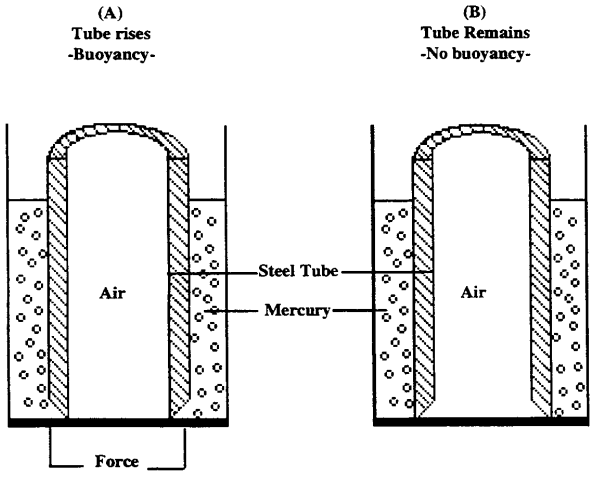
DEMONSTRATION OF BUOYANCY



Buoyancy is commonly and correctly thought of as a force tending to make a submerged object float, but the way buoyant force is applied is often misunderstood. There is a simple demonstration of the application of buoyant force -- and of the lack of it -- that clearly illustrates the principles involved.

As shown in the example above, a beaker maybe fitted at the bottom with a rubber pad. A hollow steel cylinder is beveled on each end -- the bevel being internal on one end and external on the other.

When the cylinder is held in place with the external bevel down (as in "A") and the annulus filled with mercury, fluid (hydrostatic) pressure is applied to the end of the cylinder and this force causes the cylinder to rise and float when the cylinder is released.

In contrast, when the cylinder is held in place with the internal bevel down and the annulus filled with mercury as in "B," the fluid pressure has no end area on which to act and there is no axial force. Consequently, the cylinder does not rise when released.

This illustration leads to some interesting but not always accepted conclusions. In "B," there is fluid displaced by air and steel but no buoyancy. In other words, the common concept that buoyancy is equal to the weight of fluid displaced is true only sometimes!! Buoyant forces exist only when there is an exposed end or cross-sectional area to which hydrostatic pressure can be applied vertically. It follows that the lower end of a submerged steel tube must be in compression, and that calculations using buoyed weight per foot are technically incorrect for calculating axial forces in a tubular string.

*The demonstration was originally conceived by J. Paul Sloan, then of Gulf Oil Corp, and now retired

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SECTION 17
SUCKER RODS

	Page
Dimensions	1 - 2
Make-up Torque	3 - 4
Pulling Load	5 - 6
Stength Table	7
Fiberglass	8 - 9
Weatherford Corod	10 - 12

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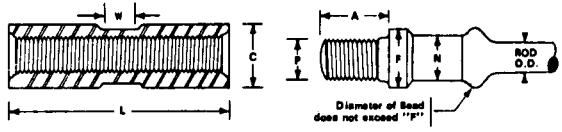
SUCKER ROD DIMENSIONS



Rod Size	"A" Length Of Pin	"F" Outside Dia. Of Shoulder	"N" Wrench Flat	"P" Outside Dia. of Pin	"C" Outside Dia. Of Full Sized Coupling	"L" Minimum Length	"W" Coupling Wrench Flat Width	Thread
1/2"	1"	1"	5/8"	3/4"	1"	2-3/4"	3/4"	3/4" 10 thd
5/8"	1-1/8"	1-1/4"	7/8"	15/16"	1-1/2"	4"	1-3/8"	15/16" 10 thd
3/4"	1-3/8"	1-1/2"	1"	1-1/16"	1-5/8"	4"	1-1/2"	1-1/16" 10 thd
7/8"	1-3/8"	1-5/8"	1"	1-3/16"	1-13/16"	4"	1-5/8"	1-3/16" 10 thd
1"	1-3/4"	2"	1-5/16"	1-3/8"	2-3/16" or *2"	4"	1-7/8"	1-3/8" 10 thd
1-1/8"	2"	2-1/4"	1-1/2"	1-9/16"	2-3/8"	4-1/2"	2-1/8"	1-9/16" 10 thd

*Used when running 1" Rods in 2-7/8" tubing. 2-3/16" is standard.

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SUCKER ROD DIMENSIONS

Size of Rod	Nominal Outside Diameter Of Pin	Outside Diameter Of Shoulder & Box	Outside Diameter Of Coupling	Length Of Pin	Minimum Length Of Wrench Square	Width of Wrench Square Rods	Width Of Wrench Flats Coupling	Minimum Length Of Coupling
5/8"	15/16"	1-3/8"	1-1/2"	1-1/8"	1-1/4"	7/8"	1-3/8"	4"
3/4"	1-1/16"	1-1/2"	1-5/8"	1-3/8"	1-1/4"	1"	1-1/2"	4"
7/8"	1-3/16"	1-5/8"	1-13/16	1-3/8"	1-1/4"	1"	1-5/8"	4"
1"	1-3/8"	2"	2-3/16" or 2"	1-3/4'	1-1/2"	1-5/16"	1-7/8"	4"
1-1/8"	1-9/16"	2-1/4"	2-3/8"	2"	1-5/8"	1-1/2"	2-1/8"	4-1/2"

SUCKER ROD WEIGHTS PER 100' - WITH COUPLINGS

25' Rods		30' Rods	
5/8"	114 lbs.	5/8"	111 lbs.
3/4"	160 lbs.	3/4"	158 lbs.
7/8"	215 lbs.	7/8"	212 lbs.
1"	290 lbs.	1"	285 lbs.
1-1/8"	367 lbs.	1-1/8"	361 lbs.

MINIMUM MECHANICAL PROPERTIES OF SUCKER RODS

Yield Point PSI	Tensile Strength PSI	Elongation In 8" %	Reduction In Area %	Brinell Hardness Number	Izod Impact Ft.-Lb.
70,000	85,000	18.0	65	166	90

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Rod Size Inches	Make Up Torque, ft-lb	
	For 35,000 psi Rod Stress	Over 35,000 psi Rod Stress
1/2	110	121
5/8	220	242
3/4	350	385
7/8	520	572
1	800	880
1-1/8	1,100	1,210

Sucker Rod Displacement			
Size	O.D. Coupling	Displacement/1000 Ft.	
		Cu. Ft.	Bbls.
5/8"	1-1/2"	2.24	0.339
3/4"	1-5/8"	3.19	0.566
7/8"	1-15/16"	4.34	0.773
1"	2-3/16"	5.67	1.01

Sucker Rod Data						
Size	Wt/Ft. W/Boxes	Shoulder	Pin Length	Pin Dia.	Thds/Inch	Box
1"	2.92 lbs.	1-15/16"	1-13/16"	1-3/8"	10V	2" x 4"
7/8"	2.25 lbs.	1-11/16"	1-3/8"	1-3/16"	10V	1-13/16" x 4"
3/4"	1.62 lbs.	1-1/2"	1-3/8"	1-3/8"	10V	1-5/8" x 4"

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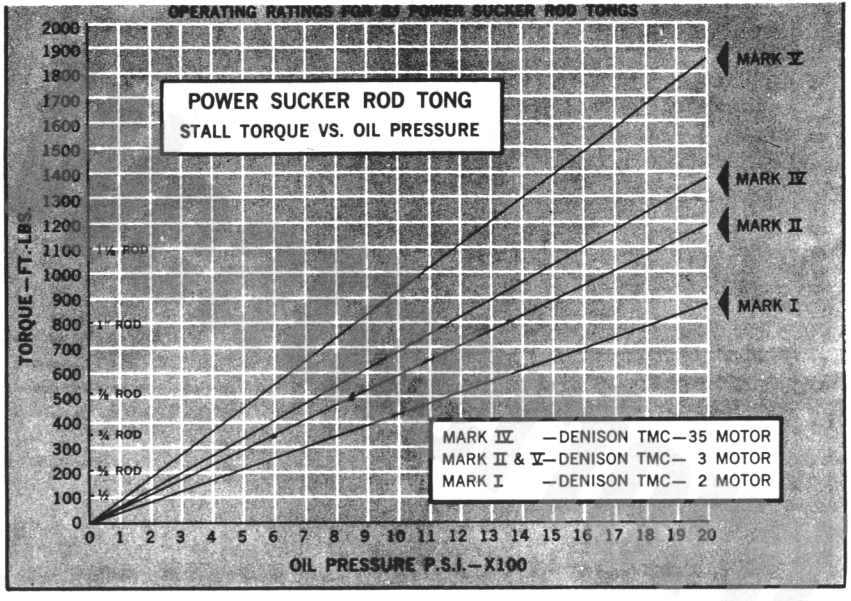
OPERATING RATINGS FOR BJ POWER SUCKER ROD TONGS



Identical part numbers denote interchangeability between sizes or with parts in other types of equipment bearing same part numbers.

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SUCKER ROD PULLING LOAD CHART

Manufacturer	Designation	Yield Point PSI	Size	Pulling Load @ Yield To Nearest 100 Lbs.
A P I GRADE C				
Bethlehem	X-2	65,000	5/8	19,900
Jones	2		3/4	28,700
National	40		7/8	39,100
Norris	30		1	51,100
Stelco	C		1-1/8	64,600
Continental-Emsco	1	60,000	5/8	18,400
Oilwell			3/4	26,500
USI Axelson	N+		7/8	36,100
	C-60		1	47,100
			1-1/8	59,600
Liberty	RA	80,000	5/8	24,500
			3/4	35,300
			7/8	48,100
			1	62,800
			1-1/8	79,500
Oilwell	B-22	95,000	5/8	29,100
			3/4	42,000
			7/8	57,100
			1	74,600
			1-1/8	94,400
USI-Axelson	S-60	100,000	5/8	30,700
			3/4	44,200
			7/8	60,100
			1	78,500
			1-1/8	99,400
Special Service Grade				
Bethlehem	X-mayari	60,000	5/8	18,400
			3/4	26,500
			7/8	36,100
			1	47,100
			1-1/8	59,600
Oilwell	L	65,000	5/8	19,900
USI-Axelson	80		3/4	28,700
			7/8	39,100
			1	51,500
			1-1/8	64,600

(Cont. on pg. 17-6)

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SUCKER ROD PULLING LOAD CHART

(Cont. from pg. 17-5)

API Grade K

Bethlehem	46	100,000	5/8	30,700
USI-Axelson	S-59		3/4	44,200
			7/8	60,100
			1	78,500
			1-1/8	99,400
Continental-Emsco	5	70,000	5/8	21,500
			3/4	30,900
			7/8	42,100
			1	55,000
			1-1/8	69,600
Jones	7	68,000	5/8	20,900
Norris	40		3/4	30,000
			7/8	40,900
			1	53,400
			1-1/8	67,600
Liberty	RM	82,000	5/8	25,200
			3/4	36,200
			7/8	49,300
			1	64,400
			1-1/8	81,500
National	81	65,000	5/8	19,900
Stelco	K		3/4	28,700
			7/8	39,100
			1	51,100
			1-1/8	64,600
Oilwell	T	73,000		22,400
				32,300
				43,900
				57,300
				72,600

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SUCKER ROD STRENGTH TABLE

Rod Size - Inches		1/2	5/8	3/4	7/8	1
Rod Area - Square Inches		.196	.306	.442	.601	.785
J&L Type 7 with ultimate	Yield	13,700	21,400	30,900	42,100	55,000
tensile strength of 86,000	Ultimate	16,800	26,300	38,000	51,700	67,500
PSI & yield of 70,000 PSI.	Torque*	70	140	171	381	570
J&L Type 2 with ultimate	Yield		19,900	28,700	39,100	51,000
tensile strength of 100,000	Ultimate		30,600	44,200	60,100	78,500
PSI & yield of 65,000 PSI.	Torque*	65	130	159	353	530
J&L Type 1 with ultimate	Yield		20,900	30,300	41,200	53,800
tensile strength of 100,000	Ultimate		30,600	44,200	60,100	78,500
PSI & yield of 68,500 PSI.	Torque*	68-1/2	136	168	372	660
J&L Type 12 with ultimate	Yield		29,400	42,300	57,700	75,300
tensile strength of 120,000	Ultimate		37,700	53,000	72,000	94,200
PSI & yield of 96,000 PSI.	Torque*	96	192	235	476	783

*Torque (ft.-lbs.) based on rod O.D. at yield.

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THE FIBERFLEX
FIBERGLASS SUCKER ROD
TECHNICAL DATA

Rod Size		3/4"	7/8"	1"	1.2"	1.25"	1.5"
Rod Body Diameter (+0.005) (-0.005)		.740"	.865"	.990"	1.175"	1.240"	1.465"
Rod Length/ Weight Per Ft.	25'	.5316	.6617	.8845	1.3001	1.3963	2.0980
	30'	.5073	.6362	.8516	1.2424	1.3421	2.0010
	37.5'	.4831	.6108	.8188	1.1846	1.2879	1.9050
API Pin Size		5/8"	3/4"	7/8"	1.0"	1.0"	1-1/8"
Diameter Of End Fitting (1+0.005) (-0.000)		1.245"	1.490"	1.615"	1.990"	1.990"	2.360"

API TOOL SIZE

Wrench		7/8"	1.0"	1.0"	1-1/8"	1-1/8"	Special
Elevators		7/8"	1.0"	1.0"	Special	Special	Special
Transfer		7/8"'	1.0"	1.0"	1-1/8"	1-1/8"	Special

OPERATING PROPERTIES

Tensile & Yield Strength (PSI)	115,000	115,000	115,000	115,000	115,000	115,000
Max Working Load (Lbs.)	15,000	20,500	27,000	38,000	42,000	59,000
Max Working Stress (PSI)	35,000	35,000	35,000	35,000	35,000	35,000
Max Load Short Term (Lbs.)	23,000	31,500	41,000	57,000	65,000	91,000
Max Stress Short Term (PSI)	53,000	53,000	53,000	53,000	53,000	53,000
Max Design Temp. (°F)	240°	240°	240°	240°	240°	240°

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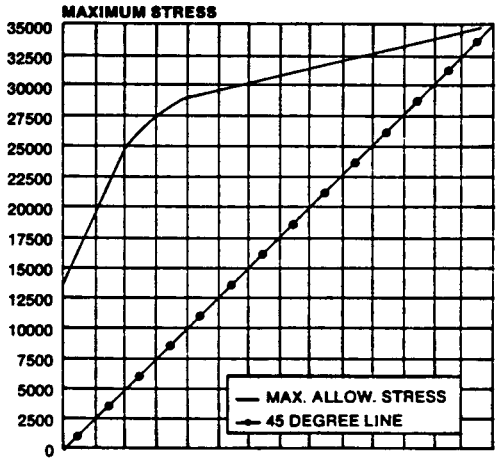
FIBERFLEX, INC.
STRESS RANGE DIAGRAM



Nominal Rod Body Diameters Covered:
3/4", 7/8", 1", *1.2", 1.25", *1.50"
End Fitting Grade: A
Modulus of Elasticity:
7.200,000 PSI (Includes Endfitting)

Cycles To First Expected Failure	Allowable Range Modifier	Operating Temperature Of Rods (°F)	Allowable Range Modifier
5.0 Million	104%	RT	105%
7.5 Million	100%	160°	100%
10.0 Million	92%	180°	98%
15.0 Million	85%	200°	95%
30.0 Million	80%	220°	88%
		240°	80%

NOTE: This Diagram applies to Fiberflex, Inc. Standard Rods. This Diagram is rated for 160°F Temperature and 7.5 Million Cycles to First Expected Failure of the Rod String.

* Diameters not recognized by the API, but do apply to the Stress Range Diagram.

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CONTINUOUS SUCKER ROD

Weatherford Corod®

Corod® Product Physical Properties

Corod No.	Nominal Size		Weight		Area		Major Diameter		Minor Diameter	
	mm	in	lb/ft	kg/m	in2	mm2	in	mm	in	mm
							+/- 0.020	+/- 0.5	+/- 0.020	+/- 0.5
8	28.6	18/16"	3.38	5.02	0.994	641	1.570	39.9	0.745	18.9
7	27.0	17/16"	3.01	4.49	0.886	571	1.430	36.3	0.745	18.9
6	25.4	16/16"	2.67	3.98	0.785	507	1.260	32.0	0.740	18.8
5	23.8	15/16"	2.35	3.50	0.690	445	1.115	28.3	0.730	18.5
4	22.2	14/16"	2.04	3.05	0.601	388	1.005	25.5	0.700	17.8
3	20.6	13/16"	1.76	2.63	0.518	335	0.940	23.9	0.650	16.5
2	19.0	12/16"	1.50	2.24	0.442	285	0.870	22.1	0.600	15.2
8.5R	29.4	18.5/16"	3.57	5.32	1.050	677	1.156	29.4	N/A	N/A
6R	25.4	16/16"	2.67	3.98	0.785	507	1.000	25.4	N/A	N/A
4R	22.2	14/16"	2.04	3.05	0.601	388	0.875	22.2	N/A	N/A
3R	20.6	13/16"	1.76	2.63	0.518	334	0.812	20.6	N/A	N/A

Corod® Product Mechanical Properties

Grade Based on API Classes and Materials	Codes	Material	Tensile Strength		Yeild Strength		Hardness HRC/Brinell
			psi	Mpa	psi	Mpa	max(+2/+15)
C Grade - Carbon Steel	C, CR	1536M	90000	620	60000	410	22/237
D Grade - Carbon Steel	D, DR	1536M	115000	790	85000	585	26/258
D Grade - Chrome Moly	DL,DLR	4130M	115000	790	90000	620	26/258
D Grade - Special Alloy	DU, DUR DE, DER	Ultra 115 4120M	115000	790	90000	620	26/258
Misc.Special Service Chrome Moly Alloy	SM,SMR	4130M	130000	895	110000	760	30/286
Special Service-Special	SU,SUR SE,SER	Ultra 150 4120M	140000	965	115000	790	34/319

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Weatherford Corod® Product

Maximum Recomm. Weight Indicator Pull On A Continuous Rod String

The following calculates the maximum rig weight indicator pull on a stuck rod string. The calculations are based on 90% of the minimum yield strength, converted into pounds, for a rod string in "like new" condition. The maximum load should be reached by applying a straight, steady pull and not a shock load.

For tapered strings, calculate the total weight in pounds of all sections of the rod string above the pump. Add to this total string weight, the value in the table below for the rod type and size of the smallest taper in the string. This is the maximum load that should be applied to pulling on a rod string, the table values are the maximum pull.

Recommended Maximum Pull Capacity

* (add this load to string weight to determine maximum pull capacity)

Rod Grade	Rod Type	Yield Strength		Corod Size	Max. Load	
		psi	MPa		lb	daN
C – Carbon Steel	C, CR	60000	410	#8	53675	23875
				#7	47840	21280
				#6,6R	42390	18856
				#5	37260	16574
				#4,4R	32450	14434
				#3,3R	27970	12442
				#2	23810	10591
D – Carbon Steel	D,DR	85000	590	#8.5R	80291	35716
				#8	76040	33824
				#7	67780	30150
				#6,6R	60050	26712
				#5	52785	23520
				#4,4R	45975	20450
				#3,3R	39625	17626
				#2	33735	15006
D – Chrome Moly Alloy & Special Alloy	DL,DLR, DE,DER, DO,DOR, DU,DUR	90000	620	#8.5R	85014	37816
				#8	80510	35813
				#7	71765	31923
				#6,6R	63585	28284
				#5	55890	24861
				#4,4R	48680	21654
				#3,3R	41955	18663
				#2	35720	15889
Miscellaneous Special Service – Chrome Moly Alloy	SM,SMR	110000	760	#8	98405	43773
				#7	87710	39015
				#6,6R	77715	34569
				#5	68310	30386
				#4,4R	59500	26467
				#3,3R	51280	22810
				#2	43660	19421
Miscellaneous Special Service – Special	SE,SER, SO,SOR, SU,SUR	115000	790	#8	102880	45763
				#7	91700	40790
				#6,6R	81245	36140
				#5	71415	31767
				#4,4R	62200	27668
				#3,3R	53610	23847
				#2	45640	20302

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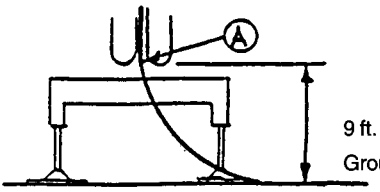
Corod

ROD FISHING PROCEDURE

Having removed rod, man-handle bottom to welding truck for fishing connection. Rod cannot be run out the bottom of gripper unit unless it is at least 9 feet above the ground.



Take a sample to aid in preparing fishing tool. Samples not less than 6 inches long each side of break must be tagged and sent to office for inspection.

Weld on a pony rod to make up to the fishing tool. Use 3/4" pony rod (of same grade of rod) if the part is within 4000 ft. of bottom. If it is more than 4000 ft. from bottom use a 7/8" pony rod (if tubing size permits).

While the weld is being made prepare the fishing tool to fit the rod sample taken.

Approximate Slip Sizes

For #2 rod use 3/4 - 7/8" reversible slips.

For #3 rod use 3/4 - 7/8" reversible slips.

For #4 rod use 7/8 - 1" reversible slips.

For #5 rod use 7/8 - 1" reversible slips or 1-1/8" polished rod slips.

For #6 rod use 1-1/8 - polished rod slips

For #7 rod use 1-1/4 polished rod slips

Always use a tapered barrel with tapered slips.

* Never put one slip into barrel reverse to the others. Use a tight fitting control spring around the slips and ensure that the washer is in place flat on top of the slips before the spring is inserted. The spring must exert considerable pressure against the slips. If it doesn't, stretch the spring so that it becomes difficult to screw on the top of the overshot because of spring pressure. Fishing tool tops are to be tightened with a pipe wrench on the bottom or open end of barrel. Pipe wrenches tend to squash or "egg" the barrel so be careful. Use a pipe vise where possible.

DO NOT USE A SHEAR COUPLING WHEN FISHING FOR ROD. THERE IS ALREADY ONE AT THE PUMP.

Fishing For Shear Couplings

For 3/4" Shear Coupling use 1-5/8" collar catcher.

If this does not work use 1-1/8" reversible polished rod slips if fishing neck is exposed.

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SECTION 18
TOOL JOINTS

	Page
API Regular	1
API Full Hole	2
API Internal Flush	3
API Numbered Connections	4
Acme Regular	5
Acme Streamline & Acme Full Hole	6
American Iron Open Hole	7
American MT	8
American PAC	9
Hughes Double Streamline	10
Hughes External Flush	11
Hughes H-90	12 - 13
Hughes Slim Hole	14
Hughes Slimline H-90	15
Hughes Xtra Hole	16
Hydril IF / F / EIU Joints	17

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SECTION 18
TOOL JOINTS

	Page
Reed Double Streamline	18
Reed External Flush	19
Reed Full Hole	20
Reed Semi-Internal Flush	21
X Series Drill Rod	22
W Series Drill Rod	23
Longyear Drill Rods	24
Recommended Max. - Min. Tool Joint Dimensions	25
Tool Joint Performance Properties	26 - 29
Rotary Shoulder Connections Interchange List	30 - 31

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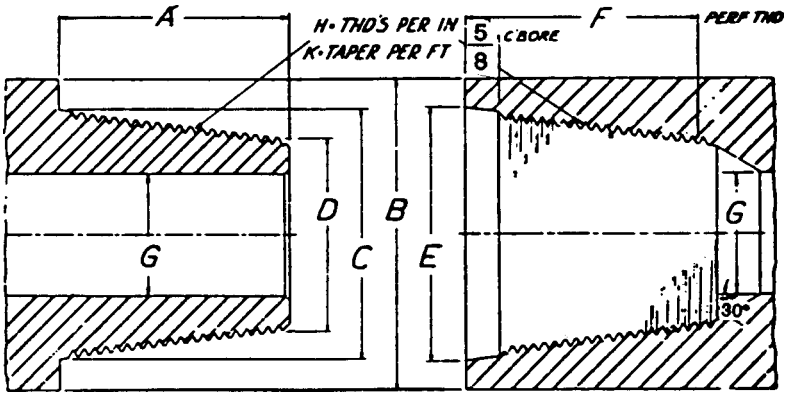
A.P.I. REGULAR (REG) DIMENSIONAL DATA



A.P.I REGULAR

Size	A	B	C	D	E	F	G	H	K
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	TPI	TPF
1 1/4	2 5/8 **66.7**	2 3/16 **55.6**	1 23/32 **43.7**	1 5/16 **33.3**	1 3/4 **44.5**	3 **76.2**	5/8 **15.9**	7	2 **50.8**
2 3/8	3 **76.2**	3 1/8 **79.4**	2 5/8 **66.7**	1 7/8 **47.6**	2 11/16 **68.3**	3 3/8 **85.7**	1 **25.4**	5	3 **76.2**
2 7/8	3 1/2 **88.9**	3 3/4 **95.3**	3 **76.2**	2 1/8 **54.0**	3 1/16 **77.8**	3 7/8 **98.4**	1 1/4 **31.8**	5	3 **76.2**
3 1/2	3 3/4 **95.3**	4 1/4 **108.0**	3 1/2 **88.9**	2 9/16 **65.1**	3 9/16 **90.5**	4 1/8 **104.8**	1 1/2 **38.1**	5	3 **76.2**
4 1/2	4 1/4 **108.0**	5 1/2 * **139.7** *	4 5/8 **117.5**	3 9/16 **90.5**	4 11/16 **119.1**	4 5/8 **117.5**	2 1/4 **57.2**	5	3 **76.2**
5 1/2	4 3/4 **120.7**	6 3/4 **171.5**	5 33/64 **140.1**	4 11/32 **110.3**	5 37/64 **141.7**	5 1/8 **130.2**	2 3/4 **69.9**	4	3 **76.2**
6 5/8	5 **127.0**	7 3/4 **196.9**	6 **152.4**	5 5/32 **131.0**	6 1/16 **154.0**	5 3/8 **136.5**	3 1/2 **88.9**	4	2 **50.8**
7 5/8	5 1/4 **133.4**	8 7/8 **225.4**	7 **177.8**	5 11/16 **144.5**	7 3/32 **180.2**	5 5/8 **142.9**	4 **101.6**	4	3 **76.2**
8 5/8	5 3/8 **136.5**	10 **254.0**	7 61/64 **202.0**	6 39/64 **167.9**	8 3/64 **204.4**	5 3/4 **146.1**	4 3/4 **120.7**	4	3 **76.2**

* 5 3/4" O.D is optional.

* 146.1 mm O.D. is optional.

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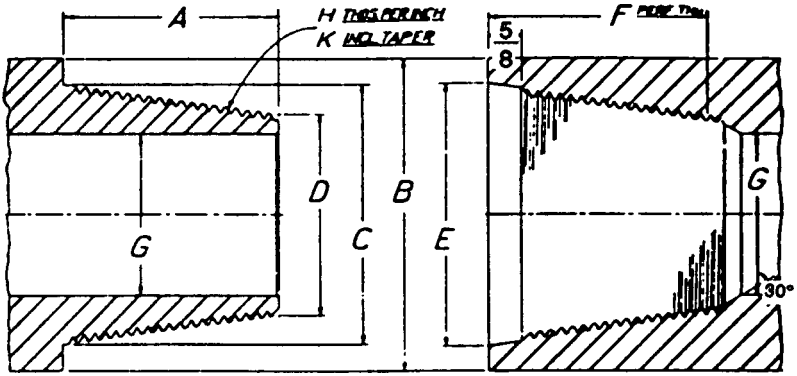
A.P.I. FULL HOLE (FH) DIMENSIONAL DATA



A.P.I. FULL HOLE

Size	A	B	C	D	E	F	G	H	K
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	TPI	TPF
2 3/8	3 **76.2**	3 3/8 **85.7**	2 25/32 **70.6**	2 1/32 **51.6**	2 13/16 **71.4**	3 1/2 **88.9**	1 7/16 **36.5**	5	3 **76.2**
2 7/8	3 1/2 **88.9**	4 1/4 **108.0**	3 5/8 **92.1**	2 15/32 **62.7**	3 13/32 **86.5**	4 **101.6**	2 1/8 **54.0**	5	3 **76.2**
3 1/2	3 3/4 **95.3**	4 5/8 **117.5**	4 **101.6**	3 1/16 **77.8**	4 3/64 **102.8**	4 1/4 **108.0**	2 1/8 **54.0**	5	3 **76.2**
4 ^	4 1/2 **114.3**	5 1/4 **133.4**	4 9/32 **108.7**	3 17/32 **89.7**	4 11/32 **110.3**	4 7/8 **123.8**	2 13/16 **71.4**	4	2 **50.8**
4 1/2	4 **101.6**	5 3/4 **146.1**	4 51/64 **121.8**	3 51/64 **96.4**	4 7/8 **123.8**	4 1/2 **114.3**	3 **76.2**	5	3 **76.2**
5 1/2	5 **127.0**	7 **177.8**	5 33/64 **140.1**	5 **127.0**	5 29/32 **150.0**	5 1/2 **139.7**	4 **101.6**	4	2 **50.8**
6 5/8	5 **127.0**	8 **203.2**	6 3/4 **171.5**	5 59/64 **150.4**	6 27/32 **173.8**	5 1/2 **139.7**	5 **127.0**	4	2 **50.8**

^ Thread portion same as 4 1/2" Reed Double Streamline

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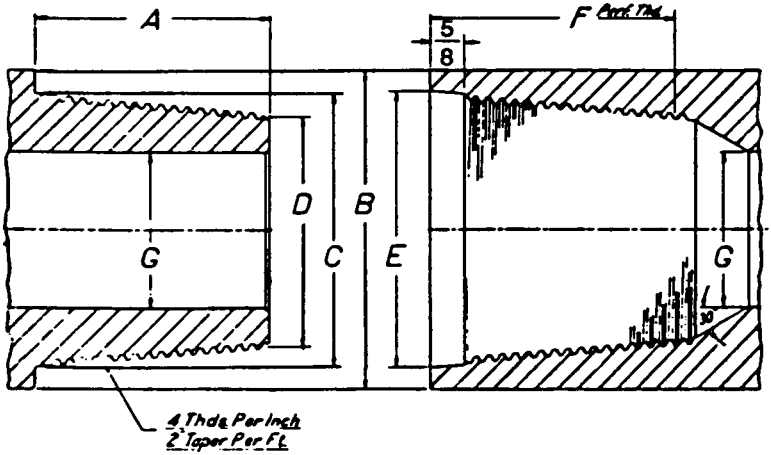
A.P.I. INTERNAL FLUSH (IF) DIMENSIONAL DATA



A.P.I. INTERNAL FLUSH

Size	A	B	C	D	E	F	G
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**
2 3/8	3 **76.2**	3 3/8 **85.7**	2 7/8 **73.0**	2 3/8 **60.3**	2 15/16 **74.6**	3 1/2 **88.9**	1 3/4 **44.5**
2 7/8	3 1/2 **88.9**	4 1/8 **104.8**	3 25/64 **86.1**	2 13/16 **71.4**	3 29/64 **87.7**	4 **101.6**	2 1/8 **54.0**
3 1/2	4 **101.6**	4 3/4 **120.7**	4 1/64 **102.0**	3 11/32 **84.9**	4 5/64 **103.6**	4 1/2 **114.3**	2 11/16 **68.3**
4 *	4 1/2 **114.3**	5 3/4 **146.1**	4 27/32 **123.0**	4 3/32 **104.0**	4 29/32 **124.6**	5 **127.0**	3 1/4 **82.6**
4 1/2 **	4 1/2 **114.3**	6 1/8 **155.6**	5 1/4 **133.4**	4 1/2 **114.3**	5 5/16 **134.9**	5 **127.0**	3 3/4 **95.3**
5 1/2	5 **127.0**	7 3/8 **187.3**	6 13/32 **162.7**	5 9/16 **141.3**	6 29/64 **163.9**	5 1/2 **139.7**	4 13/16 **122.2**
6 5/8	5 **127.0**	8 1/2 **215.9**	7 29/64 **189.3**	6 5/8 **168.3**	7 31/64 **190.1**	5 1/2 **139.7**	5 29/32 **150.0**

* Threaded portion same as 4 1/2" Hughes Xtra Hole & 5" Double Streamline

** Threaded portion same as 5 1/2" same as Reed Double Streamline.

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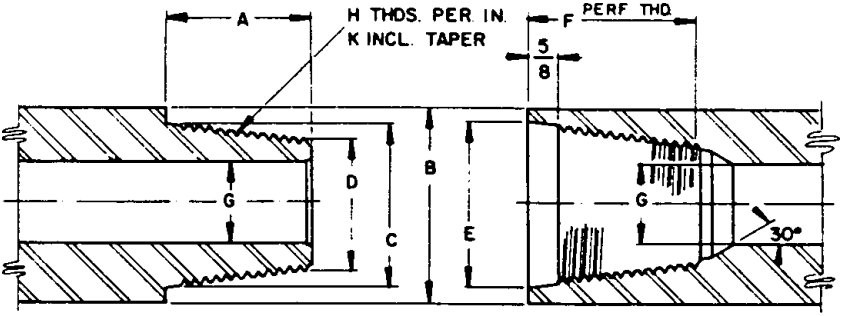
A.P.I. NUMBERED CONNECTIONS DIMENSIONAL DATA



Size	A	B	C	D	E	F	G	H	K
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	TPI	TPF
NC10	1 1/2 **38.1**	1 3/8 **34.9**	1.190 **30.2**	1.002 **25.5**	1.204 **30.6**	2 1/8 **54.0**	0.719 **18.3**	6	1 1/2
NC12	1 3/4 **44.5**	1 5/8 **41.3**	1.392 **35.4**	1.173 **29.8**	1.406 **35.7**	2 3/8 **60.3**	0.906 **23.0**	6	1 1/2
NC13	1 3/4 **44.5**	1 13/16 **46.0**	1.518 **38.6**	1.299 **33.0**	1.532 **38.9**	2 3/8 **60.3**	0.937 **23.8**	6	1 1/2
NC16	1 3/4 **44.5**	2 1/8 **54.0**	1.736 **44.1**	1.517 **38.5**	1.751 **44.5**	2 3/8 **60.3**	1.000 **25.4**	6	1 1/2
NC23	3 **76.2**	3 1/8 **79.4**	2.563 **65.1**	2.063 **52.4**	2 5/8 **66.7**	3 5/8 **92.1**	1 1/4 **31.8**	4	2
NC26	3 **76.2**	3 3/8 **85.7**	2.876 **73.1**	2.376 **60.4**	2 15/16 **74.6**	3 5/8 **92.1**	1 3/4 **44.5**	4	2
NC31	3 1/2 **88.9**	4 1/8 **104.8**	3.391 **86.1**	2.808 **71.3**	3 29/64 **87.7**	4 1/8 **104.8**	2 1/8 **54.0**	4	2
NC35	3 3/4 **95.3**	4 3/4 **120.7**	3.739 **95.0**	3.114 **79.1**	3 13/16 **96.8**	4 3/8 **111.1**	2 1/4 **57.2**	4	2
NC38	4 **101.6**	4 3/4 **120.7**	4.016 **102.0**	3.349 **85.1**	4 5/64 **103.6**	4 5/8 **117.5**	2 11/16 **68.3**	4	2
NC40	4 1/2 **114.3**	5 1/4 **133.4**	4.280 **108.7**	3.530 **89.7**	4 11/32 **110.3**	5 1/8 **130.2**	2 13/16 **71.4**	4	2
NC44	4 1/2 **114.3**	5 3/4 **146.1**	4.625 **117.5**	3.875 **98.4**	4 11/16 **119.1**	5 1/8 **130.2**	3 1/8 **79.4**	4	2
NC46	4 1/2 **114.3**	6 **152.4**	4.834 **122.8**	4.084 **103.7**	4 29/32 **124.6**	5 1/8 **130.2**	3 1/4 **82.6**	4	2
NC50	4 1/2 **114.3**	6 3/8 **161.9**	5.250 **133.4**	4.500 **114.3**	5 5/16 **134.9**	5 1/8 **130.2**	3 3/4 **95.3**	4	2
NC56	5 **127.0**	7 **177.8**	5.876 **149.3**	4.626 **117.5**	5 15/16 **150.8**	5 5/8 **142.9**	3 3/4 **95.3**	4	3
NC61	5 1/2 **139.7**	8 **203.2**	6.438 **163.5**	5.063 **128.6**	6 1/2 **165.1**	6 1/8 **155.6**	4 **101.6**	4	3
NC70	6 **152.4**	9 1/4 **235.0**	7.313 **185.8**	5.813 **147.7**	7 3/8 **187.3**	6 5/8 **168.3**	4 1/2 **114.3**	4	3
NC77	6 1/2 **165.1**	10 3/4 **273.1**	8.000 **203.2**	6.376 **162.0**	8 1/16 **204.8**	7 1/8 **181.0**	4 3/4 **120.7**	4	3

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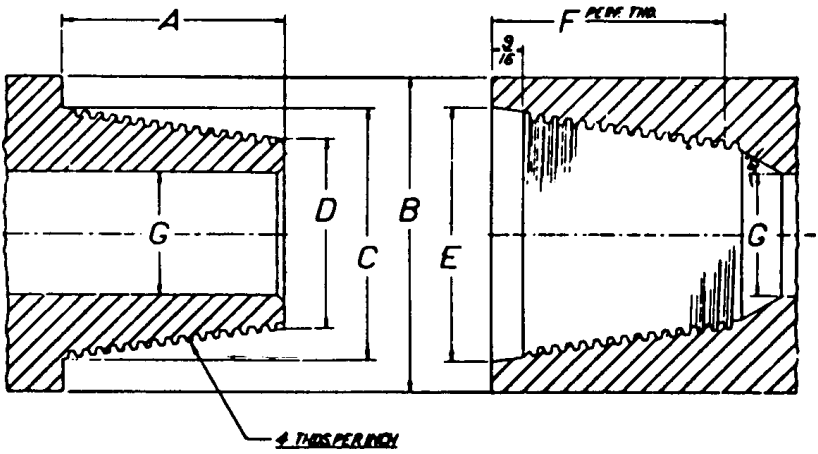
ACME REGULAR
DIMENSIONAL DATA



ACME REGULAR

Size	A	B	C	D	E	F	G
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**
2 3/8	3 **76.2**	3 1/8 **79.4**	2 19/32 **65.9**	1 3/4 **44.5**	2 5/8 **66.7**	3 1/2 **88.9**	1 **25.4**
2 7/8	3 1/2 **88.9**	3 3/4 **95.3**	2 63/64 **75.8**	2 **50.8**	3 1/64 **76.6**	3 7/8 **98.4**	1 1/4 **31.8**
3 1/2	3 1/2 **88.9**	4 1/4 **108.0**	3 17/32 **89.7**	2 35/64 **64.7**	3 9/16 **90.5**	3 7/8 **98.4**	1 3/4 **44.5**
4 1/2	4 **101.6**	5 1/2 **139.7**	4 39/64 **117.1**	3 31/64 **88.5**	4 11/16 **119.1**	4 3/8 **111.1**	2 1/2 **63.5**
5 1/2	4 1/2 **114.3**	6 3/4 **171.5**	5 41/64 **143.3**	4 3/8 **111.1**	5 43/64 **144.1**	4 7/8 **123.8**	3 **76.2**
6 5/8	5 **127.0**	7 3/4 **196.9**	6 27/64 **163.1**	5 1/64 **127.4**	6 31/64 **164.7**	5 3/8 **136.5**	3 1/2 **88.9**
Tolerances	+0.0 -1/8	± 1/32	None	None	± 1/64	None	+1/32 -0

3 3/8" taper per foot.

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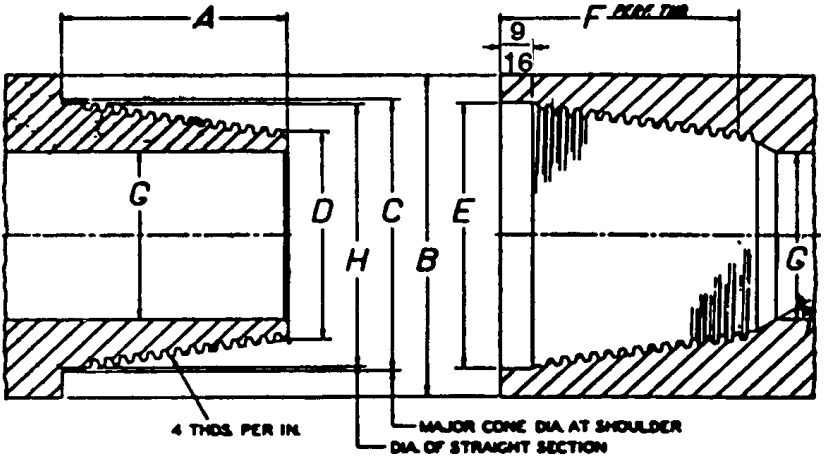
ACME STREAMLINE / ACME FULL HOLE DIMENSIONAL DATA



ACME STREAMLINE & ACME FULL HOLE

Size	A	B	C	D	E	F	*G	H
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**
2 3/8	2 7/8 **73.0**	3 3/8 **85.7**	2 7/8 **73.0**	2 1/32 **51.6**	2 3/4 **69.9**	3 5/8 **92.1**	1 7/16 **36.5**	2 47/64 **69.5**
2 7/8	3 3/8 **85.7**	4 **101.6**	3 29/64 **87.7**	2 1/2 **63.5**	3 1/2 **88.9**	3 3/4 **95.3**	1 9/16 **39.7**	3 5/16 **84.1**
3 1/2	3 3/8 **85.7**	4 5/8 **117.5**	4 **101.6**	3 3/64 **77.4**	4 3/64 **102.8**	3 3/4 **95.3**	2 5/16 **58.7**	3 55/64 **98.0**
4 1/2	4 **101.6**	5 3/4 **146.1**	4 55/64 **123.4**	3 47/64 **94.9**	4 59/64 **125.0**	4 3/8 **111.1**	2 7/8 **73.0**	4 47/64 **120.3**
5 1/2	4 1/2 **114.3**	7 **177.8**	5 31/32 **151.6**	4 45/64 **119.5**	6 1/32 **153.2**	4 7/8 **123.8**	4 **101.6**	5 55/64 **148.8**

* STD Bore
3 3/8" taper per foot.

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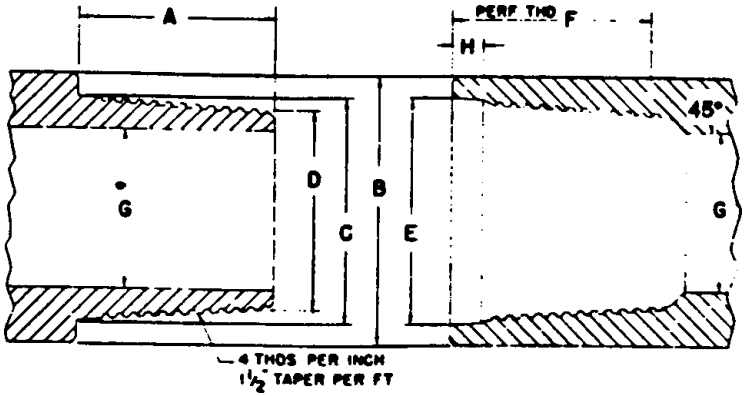
AMERICAN IRON OPEN HOLE DIMENSIONAL DATA



AMERICAN IRON OPEN HOLE

Size	A	B	C	D	E	F	G	H
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**
DRILL PIPE TOOL JOINT								
2 3/8	2 3/8 **60.3**	3 1/4 **82.6**	2 3/4 **69.9**	2 29/64 **62.3**	2 13/16 **71.4**	2 1/2 **63.5**	1 13/16 **46.0**	3/8 **9.5**
2 7/8	2 7/8 **73.0**	3 7/8 **98.4**	3 9/64 **79.8**	2 25/32 **70.6**	3 7/32 **81.8**	3 **76.2**	2.151 **54.6**	3/8 **9.5**
3 1/2	3 1/4 **82.6**	4 3/4 **120.7**	3 57/64 **98.8**	3 31/64 **88.5**	3 61/64 **100.4**	3 3/8 **85.7**	2 11/16 **68.3**	5/8 **15.9**
4	4 **101.6**	5 1/2 **139.7**	4 37/64 **116.3**	4 5/64 **103.6**	4 41/64 **117.9**	4 1/8 **104.8**	3 1/4 **82.6**	5/8 **15.9**
TUBING TOOL JOINT								
2 3/8	2 3/8 **60.3**	3 1/8 **79.4**	2 3/4 **69.9**	2 29/64 **62.3**	2 13/16 **71.4**	2 1/2 **63.5**	1.995 **50.7**	3/8 **9.5**
2 7/8	2 1/2 **63.5**	3 3/4 **95.3**	3 9/64 **79.8**	2 53/64 **71.8**	3 7/32 **81.8**	3 **76.2**	2.441 **62.0**	3/8 **9.5**
3 1/2	3 1/4 **82.6**	4 1/2 **114.3**	3 57/64 **98.8**	3 31/64 **88.5**	3 61/64 **100.4**	3 3/8 **85.7**	2.992 **76.0**	5/8 **15.9**
4	3 1/2 **88.9**	5 1/4 **133.4**	4 37/64 **116.3**	4 9/64 **105.2**	4 41/64 **117.9**	4 1/8 **104.8**	3.476 **88.3**	5/8 **15.9**
4 1/2	3 3/4 **95.3**	5 3/4 **146.1**	4 59/64 **125.0**	4 29/64 **113.1**	4 63/64 **126.6**	3 7/8 **98.4**	3.958 **100.5**	5/8 **15.9**

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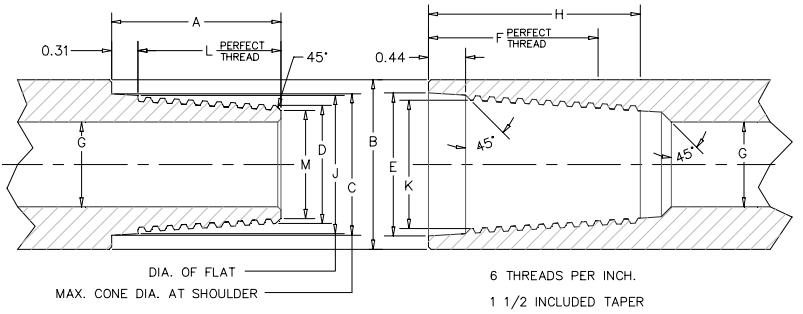
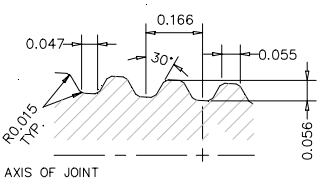
AMERICAN MACARONI TUBING (AM-MT) DIMENSIONAL DATA





AMERICAN MT

Size	A	B	C	D	E	F	G	H	J	K	L	M
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**
1	1 1/2 **38.1**	1 9/16 **39.7**	1.281 **32.5**	1.093 **27.8**	1.301 **33.0**	1 1/2 **38.1**	3/4 **19.1**	2 **50.8**	1.233 **31.3**	1.183 **30.0**	1 1/8 **28.6**	61/64 **24.2**
1 1/4	2 **50.8**	1 3/4 **44.5**	1.468 **37.3**	1.218 **30.9**	1.483 **37.7**	2 **50.8**	7/8 **22.2**	2 1/2 **63.5**	1.421 **36.1**	1.371 **34.8**	1 5/8 **41.3**	1 1/16 **27.0**
1 1/2	2 **50.8**	2 **50.8**	1.668 **42.4**	1.418 **36.0**	1.688 **42.9**	2 **50.8**	1 **25.4**	2 1/2 **63.5**	1.621 **41.2**	1.570 **39.9**	1 5/8 **41.3**	1 9/32 **32.5**

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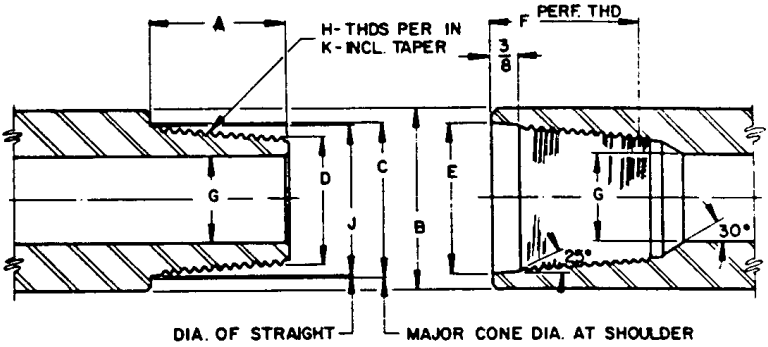
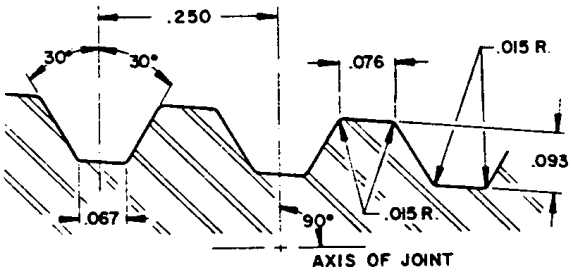
AMERICAN P.A.C. (PAC) DIMENSIONAL DATA





AMERICAN P.A.C.

Size	A	B	C	D	E	F	G	H	J	K
	in mm	in mm	in mm	in mm	in mm	in mm	in mm	TPI	in mm	TPF
2 3/8	2 3/8 60.3	2 7/8 73.0	2 23/64 59.9	2 1/16 52.4	2 27/64 61.5	2 1/2 63.5	1 3/8 34.9	4	2 5/16 58.7	1 1/2
2 7/8	2 3/8 60.3	3 1/8 79.4	2 17/32 64.3	2 15/64 56.8	2 19/32 65.9	2 1/2 63.5	1 1/2 38.1	4	2 31/64 63.1	1 1/2
3 1/2	3 1/4 82.6	3 3/4 95.3	3 3/64 77.4	2 41/64 67.1	3 7/64 79.0	3 3/8 85.7	2 50.8	4	3 76.2	1 1/2

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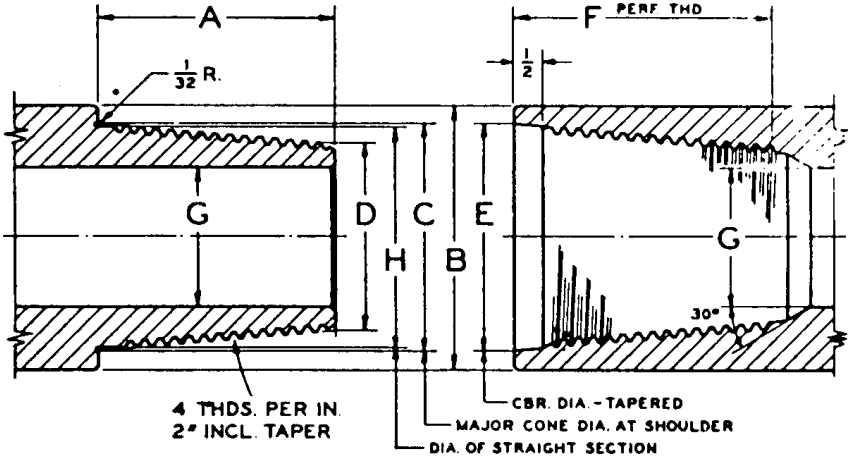
HUGHES DOUBLE STREAMLINE DIMENSIONAL DATA



HUGHES DOUBLE STREAMLINE

Size	A	B	C	D	E	F	G	H
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**
3 1/2 ①	3 7/8 **98.4**	3 7/8 **98.4**	3 21/64 **84.5**	2 11/16 **68.3**	3 23/64 **85.3**	4 1/4 **108.0**	1 13/16 **46.0**	3 15/64 **82.2**
4 ②	4 **101.6**	4 1/2 **114.3**	3 57/64 **98.8**	3 7/32 **81.8**	3 59/64 **99.6**	4 3/8 **111.1**	2 3/8 **60.3**	3 51/64 **96.4**
4 1/2 ③	4 1/2 **114.3**	5 **127.0**	4 9/32 **108.7**	3 17/32 **89.7**	4 5/16 **109.5**	4 7/8 **123.8**	2 11/16 **68.3**	4 3/16 **106.4**

① Threaded portion same as 2 7/8" Xtra Hole and 3 1/2" Reed Double Streamline.

② Threaded portion same as 4" Reed Double Streamline.

③ Threaded portion same as 4 1/2" Reed Double Streamline.

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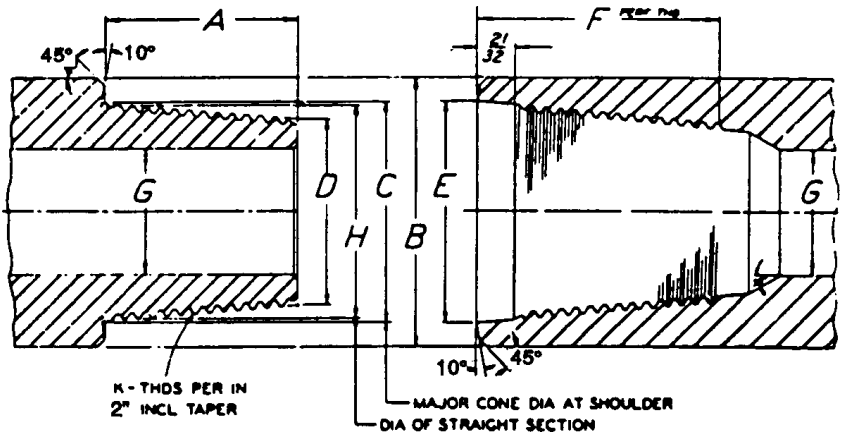
HUGHES EXTERNAL FLUSH (HEF) DIMENSIONAL DATA



HUGHES EXTERNAL FLUSH

Size	A	B	C	D	E	F	G	H	K
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	TPI
2 3/8 ③	2 3/8 **60.3**	2 1/2 **63.5**	2 7/64 **53.6**	1 23/32 **43.7**	2 1/16 * **52.4** *	3 1/4 **82.6**	1 **25.4**	2 1/64 **51.2**	6
2 7/8	2 5/8 **66.7**	3 **76.2**	2 1/2 **63.5**	2 1/16 **52.4**	2 17/32 **64.3**	3 **76.2**	1 1/16 **27.0**	- **-**	6
3 1/2 ①	3 1/4 **82.6**	3 5/8 **92.1**	3 **76.2**	2 29/64 **62.3**	3 1/32 **77.0**	4 **101.6**	1 1/2 **38.1**	- **-**	4
3 1/2 ①	3 1/4 **82.6**	3 11/16 **93.7**	3 **76.2**	2 29/64 **62.3**	3 1/32 **77.0**	4 **101.6**	1 1/2 **38.1**	- **-**	4
4 1/2 ②	3 3/8 **85.7**	4 11/16 **119.1**	3 13/16 **96.8**	3 1/4 **82.6**	3 7/8 **98.4**	4 1/4 **108.0**	2 3/16 **55.6**	- **-**	4
4 1/2 ②	3 3/8 **85.7**	4 17/32 **115.1**	3 13/16 **96.8**	3 1/4 **82.6**	3 7/8 **98.4**	4 1/4 **108.0**	2 3/16 **55.6**	- **-**	4

① Threaded portion same as or interchanges with 3 1/2" F.H. Reed External Flush.

② Threaded portion same as or interchanges with 4 1/2" F.H. Reed External Flush, 3 1/2" Hughes Xtra Hole, 3 1/2" Reed Xtra Hole and 4" Hughes Slim Hole.

③ Threaded portion same as or interchanges with 2 3/8" Homco (External Flush) "Little Inch".

* Straight Counterbore.

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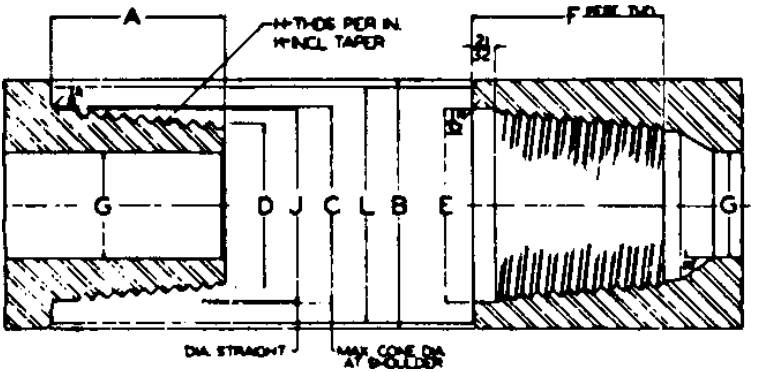
HUGHES H-90
DIMENSIONAL DATA



Size	A	B	C	D	E	F	G	H	J	K	L
	in mm	in mm	in mm	in mm	in mm	in mm	in mm	TPI	in mm	TPF	in mm
3 1/2	3 7/8 98.4	5 127.0 5 1/8 130.2 5 1/4 133.4 5 3/8 136.5 5 1/2 139.7	4.125 104.8	3.479 88.4	4 3/16 106.4	4 7/16 112.7	2 5/8 - 2 3/4 66.7 - 69.9 2 1/2 - 2 3/4 63.5 - 69.9 2 - 2 5/8 50.8 - 66.7 2 - 2 1/4 50.8 - 57.2 2 - 2 1/8 50.8 - 54.0	3 1/2	3 15/16 100.0	2	4 13/16 122.2 4 13/16 122.2 5 127.0 5 127.0 5 127.0
4	4 1/8 104.8	5 1/2 139.7 5 5/8 142.9 5 3/4 146.1 5 7/8 149.2 6 152.4	4.500 114.3	3.813 96.9	4 9/16 115.9	4 11/16 119.1	2 7/8 - 3 73.0 - 76.2 2 1/2 - 2 7/8 63.5 - 73.0 2 1/4 - 2 7/8 57.2 - 73.0 2 - 2 3/4 50.8 - 69.9 2 - 2 1/2 50.8 - 63.5	3 1/2	4 5/16 109.5	2	5 5/16 134.9 5 5/16 134.9 5 1/2 139.7 5 1/2 139.7 5 1/2 139.7
4 1/2	4 3/8 111.1	6 152.4 6 1/8 155.6 6 1/4 158.8 6 3/8 161.9 6 1/2 165.1	4.834 122.8	4.105 104.3	4 57/64 124.2	4 15/16 125.4	3 - 3 1/4 76.2 - 82.6 2 3/4 - 3 69.9 - 76.2 2 1/2 - 3 63.5 - 76.2 2 - 3 50.8 - 76.2 2 - 2 3/4 50.8 - 69.9	3 1/2	4 41/64 117.9	2	5 3/4 146.1 5 3/4 146.1 6 152.4 6 152.4 6 152.4
5	4 5/8 117.5	6 1/2 165.1 6 5/8 168.3 6 3/4 171.5 6 7/8 174.6 7 177.8	5.104 129.6	4.334 110.1	5 5/32 131.0	5 3/16 131.8	2 7/8 - 3 3/4 73.0 - 95.3 2 1/2 - 3 63.5 - 76.2 2 1/4 - 3 57.2 - 76.2 2 1/4 - 2 3/4 57.2 - 69.9 2 1/2 63.5	3 1/2	4 59/64 125.0	2	6 1/8 155.6 6 1/8 155.6 6 3/8 161.9 6 3/8 161.9 6 3/8 161.9

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HUGHES H-90
DIMENSIONAL DATA

Size	A	B	C	D	E	F	G	H	J	K	L
	in mm	in mm	in mm	in mm	in mm	in mm	in mm	TPI	in mm	TPF	in mm
5 1/2	4 5/8 117.5	6 3/4 171.5 6 7/8 174.6 7 177.8 7 1/8 181.0 7 1/4 184.2 7 3/8 187.3	5.375 136.5	4.604 116.9	5 7/16 138.1	5 3/16 131.8	3 1/8 - 3 3/8 79.4 - 85.7 3 - 3 1/4 76.2 - 82.6 2 3/4 - 3 1/4 69.9 - 82.6 2 1/4 - 3 1/4 57.2 - 82.6 2 1/4 - 3 57.2 - 76.2 2 1/4 - 2 3/4 57.2 - 69.9	3 1/2	5 3/16 131.8	2	6 3/8 161.9 6 5/8 168.3 6 5/8 168.3 6 5/8 168.3 6 5/8 168.3
6 5/8	4 7/8 123.8	7 1/2 190.5 7 5/8 193.7 7 3/4 196.9 7 7/8 200.0 8 203.2 8 1/8 206.4 8 1/4 209.6	6.000 152.4	5.188 131.8	6 1/16 154.0	5 11/64 131.4	2 1/4 - 2 1/2 57.2 - 63.5 3 3/8 85.7 3 1/4 - 3 1/2 82.6 - 88.9 3 - 3 1/2 76.2 - 88.9 2 1/2 - 3 1/2 63.5 - 88.9 2 1/2 - 3 1/4 63.5 - 82.6 2 1/2 - 3 63.5 - 76.2	3 1/2	5 13/16 147.6	2	6 5/8 168.3 7 1/4 184.2 7 1/2 190.5 7 1/2 190.5 7 1/2 190.5 7 1/2 190.5 7 1/2 190.5
7	5 3/8 136.5	8 1/4 209.6 8 3/8 212.7 8 1/2 215.9 8 5/8 219.1 8 3/4 222.3 9 228.6	6.500 165.1	5.156 131.0	7 1/8 181.0	5 15/16 150.8	3 1/2 - 3 3/4 88.9 - 95.3 2 3/4 - 3 3/4 69.9 - 95.3 2 3/4 - 3 3/4 69.9 - 95.3 2 3/4 - 3 1/2 69.9 - 88.9 2 3/4 - 3 1/4 69.9 - 82.6 2 3/4 - 3 69.9 - 76.2	3 1/2	6 3/8 161.9	3	8 203.2 8 203.2 8 1/4 209.6 8 1/4 209.6 8 1/4 209.6 8 5/8 219.1
7 5/8	6 152.4	9 1/2 241.3 9 5/8 244.5 9 3/4 247.7 9 7/8 250.8 10 254.0 10 1/4 260.4	7.389 187.7	5.889 149.6	8 203.2	6 9/16 166.7	3 1/2 - 4 88.9 - 101.6 3 - 4 76.2 - 101.6 3 - 4 76.2 - 101.6 3 - 4 76.2 - 101.6 3 - 3 3/4 76.2 - 95.3 3 - 3 1/4 76.2 - 82.6	3 1/2	7 17/64 184.5	3	9 1/4 235.0 9 1/4 235.0 9 1/4 235.0 9 5/8 244.5 9 5/8 244.5 9 5/8 244.5
8 5/8	6 1/2 165.1	10 3/4 273.1 11 279.4 11 1/4 285.8 11 1/2 292.1	8.264 209.9	6.639 168.6	9 3/8 238.1	7 1/16 179.4	3 1/2 - 4 88.9 - 101.6 3 - 4 76.2 - 101.6 3 - 4 76.2 - 101.6 3 - 3 3/4 76.2 - 95.3	3 1/2	8 9/64 206.8	3	10 1/2 266.7 10 1/2 266.7 10 3/4 273.1 10 3/4 273.1

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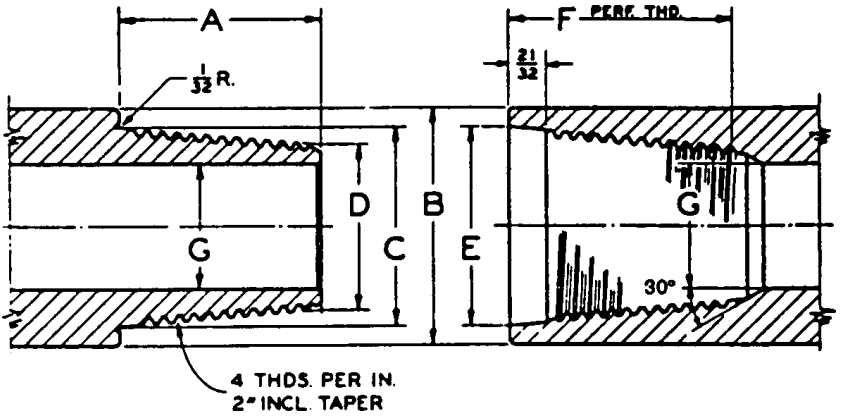
HUGHES SLIM HOLE (SH)
DIMENSIONAL DATA



HUGHES SLIM HOLE

Size	A	B	C	D	E	F	G
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**
2 3/8	2 7/8 **73.0**	2 7/8 **73.0**	2 7/16 **61.9**	1 61/64 **49.6**	2 1/2 **63.5**	3 1/8 **79.4**	1 1/4 **31.8**
2 7/8 ①	2 7/8 **73.0**	3 3/8 **85.7**	2 7/8 **73.0**	2 25/64 **60.7**	2 15/16 **74.6**	3 1/8 **79.4**	1 3/4 **44.5**
3 1/2 ②	3 3/8 **85.7**	4 1/8 **104.8**	3 25/64 **86.1**	2 53/64 **71.8**	3 29/64 **87.7**	3 5/8 **92.1**	2 1/8 **54.0**
4 ③	3 3/8 **85.7**	4 5/8 **117.5**	3 13/16 **96.8**	3 1/4 **82.6**	3 7/8 **98.4**	3 5/8 **92.1**	2 9/16 **65.1**
4 1/2 ④	3 7/8 **98.4**	5 **127.0**	4 1/64 **102.0**	3 3/8 **85.7**	4 5/64 **103.6**	4 1/4 **108.0**	2 11/16 **68.3**

① Threaded portion same as 2 3/8" API-IF, NC26.

② Threaded portion same as 2 7/8" API-IF, NC31.

③ Threaded portion same as 3 1/2" Hughes Xtra Hole and 3 1/2" Reed Semi-Internal Flush.

④ Threaded portion same as 3 1/2" API-IF, NC38.

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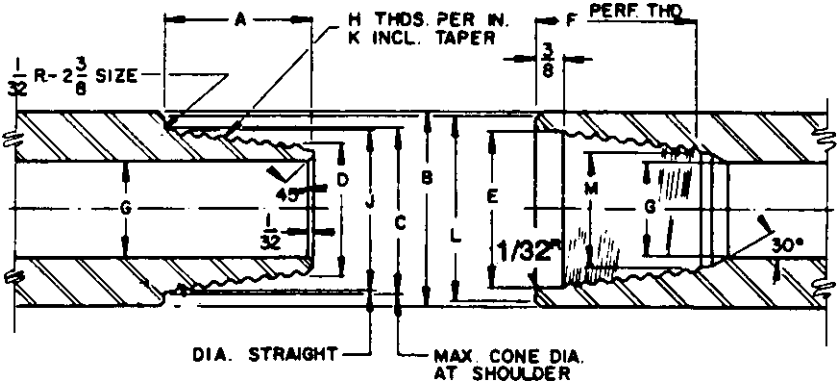
HUGHES SLIM LINE H-90 HOLE (SH) DIMENSIONAL DATA



Size	A	B	C	D	E	F	G	J	L	M	N
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**
2 3/8	2 3/4 **69.9**	3 1/8 **79.4** 3 1/4 **82.6**	2.725 **69.2**	2.439 **62.0**	2 49/64 **70.2**	3 1/16 **77.8**	1 1/2 **38.1**	2 43/64 **67.9**	3 1/16 **77.8** 3 3/16 **81.0**	2 1/4 **57.2**	2 5/8 **66.7**
2 7/8	2 7/8 **73.0**	3 3/4 **95.3** 3 7/8 **98.4** 4 **101.6** 4 **101.6** 4 1/8 **104.8** 4 1/4 **108.0**	3.196 **81.2**	2.897 **73.6**	3 15/64 **82.2**	3 3/8 **85.7**	2 1/8 - 2 1/4 **54.0 - 57.1** 2 1/8 - 2 1/4 **54.0 - 57.1** 2 1/8 - 2 1/4 **54.0 - 57.1** 2 **50.8** 1 3/4 - 2 **44.5 - 50.8** 1 1/2 - 1 3/4 **38.1 - 44.5**	3 5/32 **80.2**	3 5/8 **92.1** 3 23/32 **94.5** 3 13/16 **96.8** 3 13/16 **96.8** 3 29/32 **99.2** 4 **101.6**	2 45/64 **68.7**	3 3/32 **78.6**
3 1/2	3 1/8 **79.4**	4 5/8 **117.5** 4 3/4 **120.7** 4 7/8 **123.8** 4 7/8 **123.8** 5 **127.0** 5 1/8 **130.2**	3.835 **97.4**	3.509 **89.1**	3 7/8 **98.4**	3 3/8 **85.7**	2 3/8 - 2 3/4 **60.3 - 69.9** 2 1/2 - 2 3/4 **63.5 - 69.9** 2 5/8 **66.7** 2 3/8 - 2 1/2 **60.3 - 63.5** 2 - 2 3/8 **50.8 - 60.3** 1 3/4 - 2 1/8 **44.5 - 54.0**	3 25/32 **96.0**	4 7/16 **112.7** 4 17/32 **115.1** 4 5/8 **117.5** 4 5/8 **117.5** 4 23/32 **119.9** 4 13/16 **122.2**	3 11/32 **84.9**	3 47/64 **94.9**

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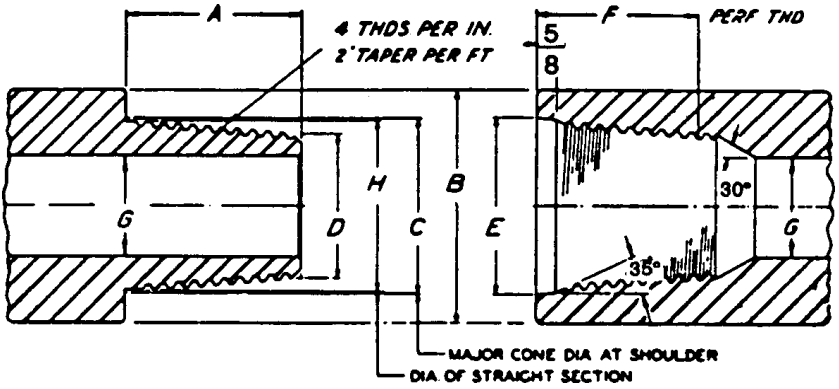
HUGHES EXTRA HOLE (XH) DIMENSIONAL DATA



HUGHES XTRA HOLE

Size	A	B	C	D	E	F	G	H
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**
2 7/8 ①	3 7/8 **98.4**	4 1/4 **108.0**	3 21/64 **84.5**	2 11/16 **68.3**	3 23/64 **85.3**	4 1/2 **114.3**	1 7/8 **47.6**	3 7/32 **81.8**
3 1/2 ②	3 3/8 **85.7**	4 3/4 **120.7**	3 13/16 **96.8**	3 1/4 **82.6**	3 7/8 **98.4**	3 15/16 **100.0**	2 7/16 **61.9**	3 45/64 **94.1**
4 1/2 ③	4 3/8 **111.1**	6 1/4 **158.8**	4 53/64 **122.6**	4 7/64 **104.4**	4 29/32 **124.6**	4 15/16 **125.4**	3 1/4 **82.6**	4 23/32 **119.9**
5 ④	4 1/2 **114.3**	6 3/8 **161.9**	5 1/4 **133.4**	4 1/2 **114.3**	5 5/16 **134.9**	4 7/8 **123.8**	3 3/4 **95.3**	5 9/64 **130.6**

① Threaded portion same as 3 1/2" Reed Double Streamline.
② Threaded portion same as 4 1/2" Hughes Ext. Flush and 4 1/2" F.H. Reed Ext. Flush.
③ Threaded portion same as 4" API-IF and 5" Reed Double Streamline.
④ Threaded portion same as 4 1/2" API-IF and 5 1/2" Reed Double Streamline.

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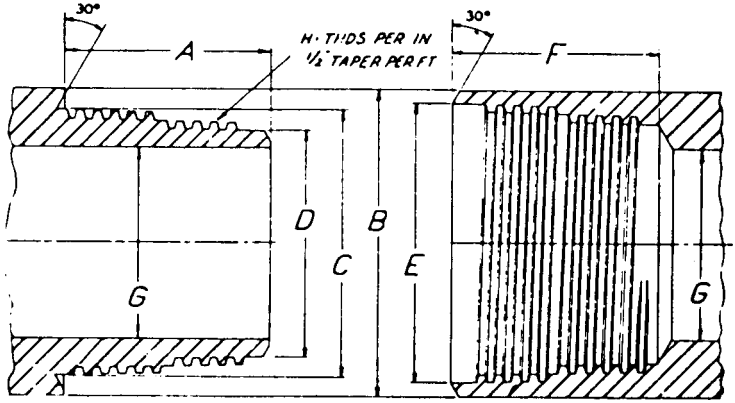
HYDRIL IF / F / EIU JOINTS
DIMENSIONAL DATA



Type	Size	Weight	A	B	C	D	E	F	G	H
		lb/ft	in	in	in	in	in	in	in	TPI
		Kg/m	mm	mm	mm	mm	mm	mm	mm	
IF	2 3/8	6.65	3 15/16	3 3/8	2 13/16	2 21/64	2 13/16	3 59/64	1 3/4	3
		9.90	100.0	85.7	71.4	59.1	71.4	99.6	44.5	76.2
	2 7/8	10.40	3 57/64	3 7/8	3 3/16	2 45/64	3 3/16	3 59/64	2 7/64	3
		15.48	98.8	98.4	81.0	68.7	81.0	99.6	53.6	76.2
	2 7/8	11.80	3 57/64	3 7/8	3 3/16	2 45/64	3 3/16	3 59/64	2	3
		17.56	98.8	98.4	81.0	68.7	81.0	99.6	50.8	76.2
	3 1/2	13.30	3 61/64	4 1/2	3 27/32	3 23/64	3 27/32	3 31/32	2 3/4	3
		19.79	100.4	114.3	97.6	85.3	97.6	100.8	69.9	76.2
	3 1/2	15.50	3 61/64	4 1/2	3 27/32	3 23/64	3 27/32	3 31/32	2 9/16	3
		23.07	100.4	114.3	97.6	85.3	97.6	100.8	65.1	76.2
	4 1/2	16.60	4	6	5 13/64	4 35/64	5 7/32	4 1/64	3 3/4	3
		24.70	101.6	152.4	132.2	115.5	132.6	102.0	95.3	76.2
	4 1/2	20.00	4	6	5 13/64	4 35/64	5 7/32	4 1/64	3 3/4	3
		29.76	101.6	152.4	132.2	115.5	132.6	102.0	95.3	76.2
	5 *	20.50	4 23/32	6 5/8	5 25/32	5 1/64	5 51/64	4 3/4	4 3/16	2
		30.51	119.9	168.3	146.8	127.4	147.2	120.7	106.4	50.8
F	2 3/8	6.65	2 5/8	2 3/8	1 59/64	1 43/64	1 15/16	2 15/32	1	4
		9.90	66.7	60.3	48.8	42.5	49.2	62.7	25.4	101.6
	2 7/8	10.40	3 21/32	2 7/8	2 23/64	1 29/32	2 3/8	3 1/2	1 1/16	4
		15.48	92.9	73.0	59.9	48.4	60.3	88.9	27.0	101.6
	3 1/2	13.30	4 1/16	3 1/2	2 13/16	2 21/64	2 13/16	3 59/64	1 1/2	3
		19.79	103.2	88.9	71.4	59.1	71.4	99.6	38.1	76.2
	4	14.00	3 59/64	4 1/16	3 5/16	2 55/64	3 11/32	3 29/32	2	3
		20.83	99.6	103.2	84.1	72.6	84.9	99.2	50.8	76.2
	4 1/2	16.60	3 61/64	4 1/2	3 27/32	3 23/64	3 27/32	3 31/32	2 3/16	3
		24.70	100.4	114.3	97.6	85.3	97.6	100.8	55.6	76.2
	5 *	19.50	4 5/16	5	4 3/16	3 35/64	4 13/64	4	2 5/16	3
		29.02	109.5	127.0	106.4	90.1	106.8	101.6	58.7	76.2
	5 1/2	21.90	4 1/4	5 9/16	4 21/32	4 1/64	4 43/64	4 1/32	2 3/4	3
		32.59	108.0	141.3	118.3	102.0	118.7	102.4	69.9	76.2
	6 5/8 *	25.20	5 5/16	6 5/8	5 11/16	4 29/32	5 45/64	5 1/8	3 1/2	2
		37.50	134.9	168.3	144.5	124.6	144.9	130.2	88.9	50.8
EIU	3 1/2	13.30	4 1/4	4 5/8	3 47/64	3 17/64	3 3/4	4	2 7/16	3
		19.79	108.0	117.5	94.9	82.9	95.3	101.6	61.9	76.2
	4	14.00	4 5/16	5 9/16	4 21/64	4 1/64	4 43/64	4 1/32	3 1/8	3
		20.83	109.5	141.3	109.9	102.0	118.7	102.4	79.4	76.2
	4 1/2	20.00	4 7/16	5 3/4	4 47/64	4 3/32	4 3/4	4 1/8	3 5/32	3
		29.76	112.7	146.1	120.3	104.0	120.7	104.8	80.2	76.2
	5 1/2	21.90	5 1/2	7	5 53/64	5 1/16	5 27/32	5 1/8	4	2
		32.59	139.7	177.8	148.0	128.6	148.4	130.2	101.6	50.8
	6 5/8 *	25.20	5 1/2	8	6 7/8	6 7/64	6 57/64	5 1/8	5	2
		37.50	139.7	203.2	174.6	155.2	175.0	130.2	127.0	50.8

* Obsolete Hydril Connection.

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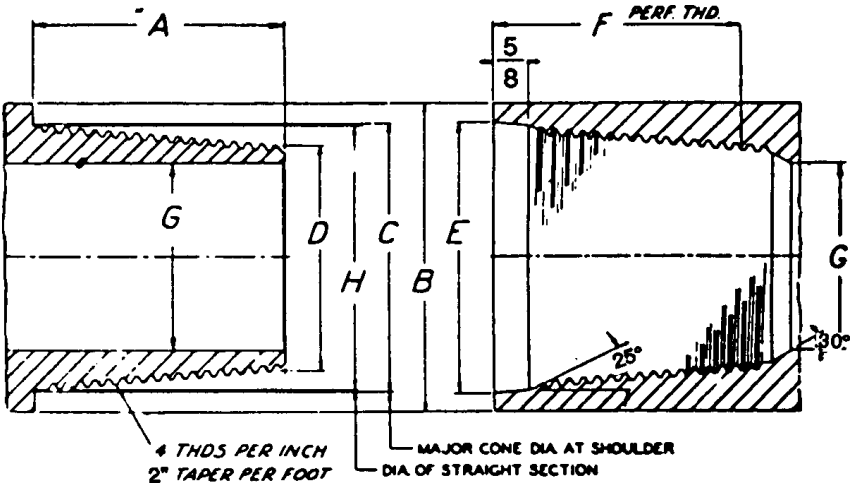
REED DOUBLE STREAMLINE DIMENSIONAL DATA



REED DOUBLE STREAMLINE

Size	A	B	C	D	E	F	G	H
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**
2 7/8	3 1/2 **88.9**	3 1/4 **82.6**	2 45/64 **68.7**	2 1/8 **54.0**	2 5/8 * **66.7**	3 7/8 **98.4**	1 1/4 **31.8**	2 19/32 **65.9**
3 1/2 ①	4 **101.6**	3 7/8 **98.4**	3 21/64 **84.5**	2 21/32 **67.5**	3 1/4 * **82.6**	4 3/8 **111.1**	1 13/16 **46.0**	3 15/64 **82.2**
4	4 **101.6**	4 1/2 **114.3**	3 57/64 **98.8**	3 7/32 **81.8**	3 55/64 * **98.0**	4 3/8 **111.1**	2 3/8 **60.3**	3 51/64 **96.4**
4 1/2	4 1/2 **114.3**	5 **127.0**	4 9/32 **108.7**	3 17/32 **89.7**	4 15/64 * **107.6**	4 7/8 **123.8**	2 11/16 **68.3**	4 3/16 **106.4**
5 ②	4 1/2 **114.3**	5 9/16 * **141.3** *	4 53/64 **122.6**	4 5/64 **103.6**	4 55/64 **123.4**	4 7/8 **123.8**	3 3/8 **85.7**	4 3/4 **120.7**
5 1/2 ③	4 1/2 **114.3**	6 1/8 **155.6** *	5 1/4 **133.4**	4 1/2 **114.3**	5 5/16 **134.9**	4 7/8 **123.8**	3 3/4 **95.3**	5 3/16 **131.8**

* Straight Counterbore

① Threaded portions same as 2 7/8" Hughes Xtra Hole

② Threaded portions same as 4" API-IF and 4 1/2" Hughes Xtra Hole.

③ Threaded portions same as 4 1/2" API-IF.

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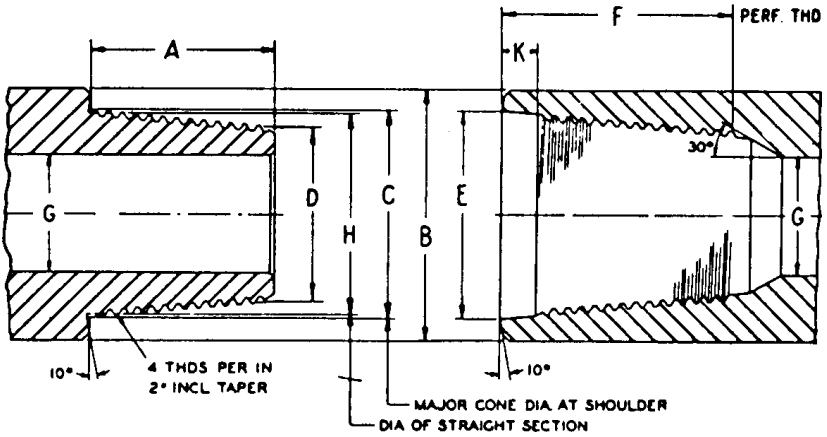
REED EXTERNAL FLUSH
DIMENSIONAL DATA



REED EXTERNAL FLUSH

Size	Type	A	B	C	D	E	F	G	H	K
		in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**
2 3/8	Reg	2 5/8 **66.7**	2 3/8 **60.3**	2 **50.8**	1 9/16 **39.7**	1 15/16 * **49.2**	3 **76.2**	7/8 **22.2**	1 15/16 **49.2**	1/2 **13**
2 3/8	FH	2 5/8 **66.7**	2 1/2 **63.5**	2 1/8 **54.0**	1 11/16 **42.9**	2 1/16 * **52.4**	3 **76.2**	1 **25.4**	2 1/64 **51.2**	1/2 **12.7**
2 7/8	FH	3 **76.2**	3 **76.2**	2 13/32 **61.1**	1 29/32 **48.4**	2 3/8 * **60.3**	3 3/8 **85.7**	1 1/4 **31.8**	2 **58.7**	1/2 **12.7**
3 1/2	FH①	3 1/4 **82.6**	3 5/8 **92.1**	3 **76.2**	2 29/64 **62.3**	3 1/32 **77.0**	4 **101.6**	1 1/2 **38.1**	-	21/32 **16.7**
4 1/2	FH②	3 3/8 **85.7**	4 11/16 **119.1** *	3 13/16 **96.8**	3 1/4 **82.6**	3 7/8 **98.4**	4 1/4 **108.0**	2 3/16 **55.6**	-	21/32 **16.7**

* Straight Counterbore

① Threaded portion same as 3/12" Hughes External Flush.

② Threaded portion same as 4 1/2" Hughes External Flush, 3 1/2" Hughes Xtra Hole, 4" Hughes Slim Hole and 3 1/2" Reed Extra Hole.

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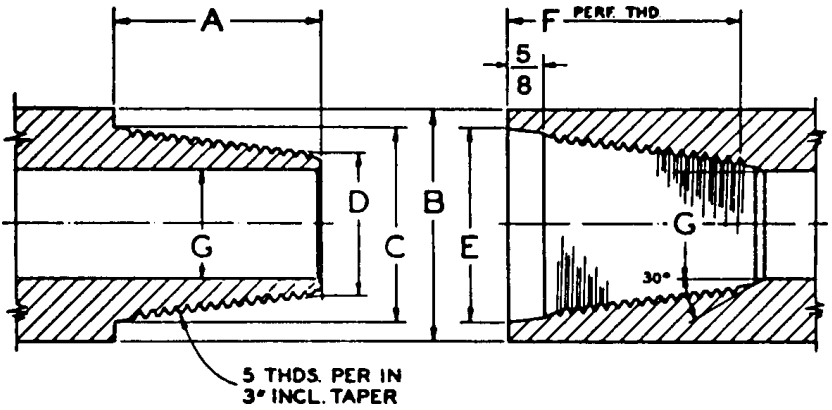
REED FULL HOLE
DIMENSIONAL DATA



REED FULL HOLE

Size	A	B	C	D	E	F	G
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**
2 3/8	3 **76.2**	3 3/8 **85.7**	2 25/32 **70.6**	2 1/32 **51.6**	2 27/32 **72.2**	3 3/8 **85.7**	1 7/16 **36.5**
2 7/8	3 1/2 **88.9**	4 **101.6**	3 11/32 **84.9**	2 15/32 **62.7**	3 13/32 **86.5**	3 7/8 **98.4**	1 7/8 **47.6**

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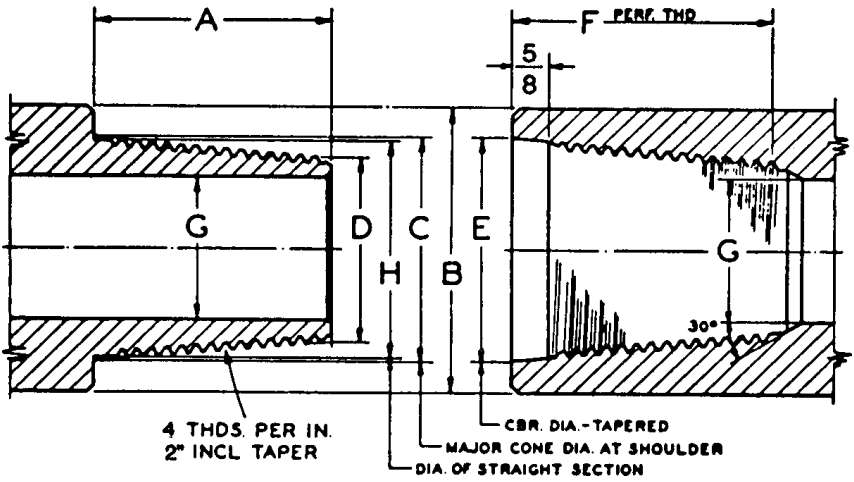
REED SEMI-INTERNAL FLUSH DIMENSIONAL DATA



REED SEMI-INTERNAL FLUSH

Size	A	B	C	D	E	F	G	H
	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**	in **mm**
3 1/2 ①	3 1/2 **88.9**	4 7/8 **123.8**	3 13/16 **96.8**	3 9/64 **79.8**	3 7/8 **98.4**	4 3/8 **111.1**	2 7/16 **61.9**	3 45/64 **94.1**
4 1/2 ②	4 1/2 **114.3**	6 **152.4**	4 53/64 **122.6**	4 5/64 **103.6**	4 57/64 **124.2**	4 7/8 **123.8**	3 5/16 **84.1**	4 23/32 **119.9**
5 ③	4 1/2 **114.3**	6 1/8 **155.6**	5 1/4 **133.4**	4 1/2 **114.3**	5 5/16 **134.9**	4 7/8 **123.8**	3 3/4 **95.3**	5 9/64 **130.6**

① Threaded portions same as 3 1/2" Hughes Xtra Hole and 4" Hughes Slim Hole.

② Threaded portion same as 4" API-IF and 4 1/2" Hughes Xtra Hole and 5" Reed Double Streamline.

③ Threaded portion same as 4 1/2" API-IF and 5" Hughes Xtra Hole and 5 1/2" Reed Double Streamline.

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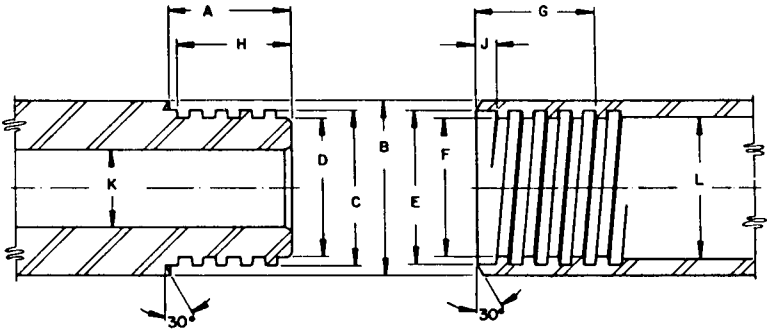
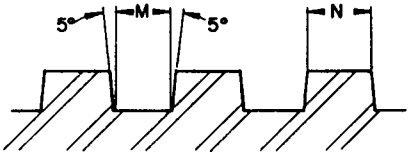
"X" SERIES DRILL ROD DIMENSIONAL DATA





Symbol	A	B	C		D		E		F		G
			Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm
E ROD (3*)	1.50 **38.10**	1.312 **33.32**	0.999 **25.37**	0.997 **25.32**	0.874 **22.20**	0.870 **22.10**	1.003 **25.48**	1.001 **25.43**	0.878 **22.30**	0.876 **22.25**	1.625 **41.28**
A ROD (3*)	1.75 **44.45**	1.625 **41.28**	1.264 **32.11**	1.262 **32.05**	1.139 **28.93**	1.134 **28.80**	1.268 **32.21**	1.266 **32.16**	1.143 **29.03**	1.141 **28.98**	1.875 **47.63**
B ROD (5*)	1.87 **47.50**	1.906 **48.41**	1.405 **35.69**	1.403 **35.64**	1.280 **32.51**	1.275 **32.39**	1.409 **35.79**	1.407 **35.74**	1.284 **32.61**	1.282 **32.56**	2.000 **50.80**
N ROD (4*)	2.37 **60.20**	2.375 **60.33**	1.874 **47.60**	1.872 **47.55**	1.686 **42.82**	1.681 **42.70**	1.878 **47.70**	1.876 **47.65**	1.690 **42.93**	1.688 **42.88**	2.500 **63.50**
N ROD (3*)	2.37 **60.20**	2.375 **60.33**	1.874 **47.60**	1.872 **47.55**	1.686 **42.82**	1.681 **42.70**	1.878 **47.70**	1.876 **47.65**	1.690 **42.93**	1.688 **42.88**	2.500 **63.50**

Symbol	H	J	K	L	M (Box)		M (Pin)		N (Box)		N (Pin)	
					Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm
E ROD (3*)	1.437 **36.50**	0.25 **6.35**	0.437 **11.10**	0.843 **21.41**	0.1680 **4.27**	0.1617 **4.11**	0.1657 **4.21**	0.1617 **4.11**	0.1608 **4.08**	0.1544 **3.92**	0.1608 **4.08**	0.1563 **3.97**
A ROD (3*)	1.687 **42.85**	0.25 **6.35**	0.562 **14.27**	1.265 **32.13**	0.1680 **4.27**	0.1617 **4.11**	0.1657 **4.21**	0.1617 **4.11**	0.1608 **4.08**	0.1544 **3.92**	0.1608 **4.08**	0.1563 **3.97**
B ROD (5*)	1.812 **46.02**	0.25 **6.35**	0.625 **15.88**	1.406 **35.71**	0.1014 **2.58**	0.0950 **2.41**	0.0990 **2.51**	0.0950 **2.41**	0.0941 **2.39**	0.0877 **2.23**	0.0941 **2.39**	0.0897 **2.28**
N ROD (4*)	2.312 **58.72**	0.31 **7.87**	1.000 **25.40**	2.000 **50.80**	0.1236 **3.14**	0.1173 **2.98**	0.1212 **3.08**	0.1173 **2.98**	0.1163 **2.95**	0.1099 **2.79**	0.1164 **2.96**	0.1120 **2.84**
N ROD (3*)	2.312 **58.72**	0.31 **7.87**	1.000 **25.40**	2.000 **50.80**	0.1653 **4.20**	0.1590 **4.04**	0.1653 **4.20**	0.1590 **4.04**	0.1581 **4.02**	0.1517 **3.85**	0.1581 **4.02**	0.1517 **3.85**

* Threads per inch.

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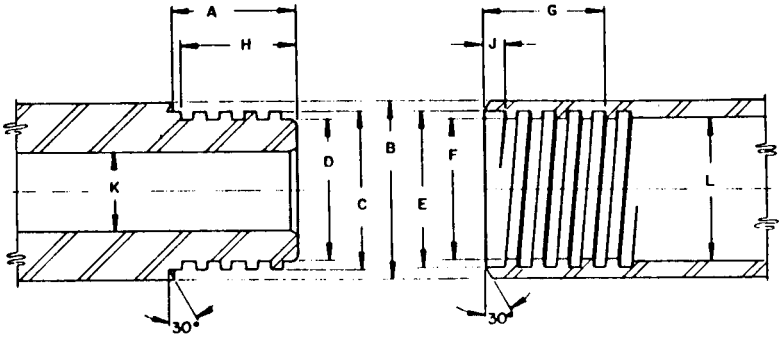
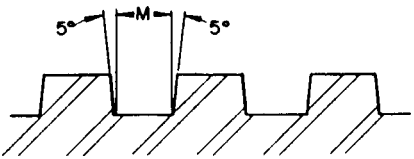
"W" SERIES DRILL ROD DIMENSIONAL DATA





Symbol	A	B	C		D		E		F	
			Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm
EW ROD (3*)	1.56 **39.67**	1.375 **34.93**	1.062 **26.97**	1.060 **26.92**	0.937 **23.80**	0.932 **23.67**	1.066 **27.08**	1.064 **27.03**	0.941 **23.90**	0.939 **23.85**
AW ROD (3*)	1.88 **47.63**	1.750 **44.45**	1.374 **34.90**	1.372 **34.85**	1.249 **31.72**	1.244 **31.60**	1.378 **35.00**	1.376 **34.95**	1.253 **31.83**	1.251 **31.78**
BW ROD (3*)	2.25 **57.15**	2.125 **53.98**	1.684 **42.77**	1.682 **42.72**	1.527 **38.79**	1.522 **38.66**	1.688 **42.88**	1.686 **42.82**	1.531 **38.89**	1.529 **38.84**
NW ROD (3*)	2.75 **69.85**	2.625 **66.68**	2.218 **56.34**	2.216 **56.29**	2.030 **51.56**	2.025 **51.44**	2.222 **56.44**	2.220 **56.39**	2.034 **51.66**	2.032 **51.61**

Symbol	G	H	J	K	L	M (Box)		M (Pin)	
						Max.	Min.	Max.	Min.
	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm	in mm
EW ROD (3*)	1.562 **39.67**	1.437 **36.50**	0.312 **7.92**	0.437 **11.10**	1.062 **26.97**	0.1680 **4.27**	0.1617 **4.11**	0.1657 **4.21**	0.1617 **4.11**
AW ROD (3*)	1.875 **47.63**	1.750 **44.45**	0.375 **9.53**	0.625 **15.88**	1.437 **36.50**	0.1680 **4.27**	0.1617 **4.11**	0.1657 **4.21**	0.1617 **4.11**
BW ROD (3*)	2.250 **57.15**	2.125 **53.98**	0.375 **9.53**	0.750 **19.05**	1.812 **46.02**	0.1665 **4.23**	0.1604 **4.07**	0.1641 **4.17**	0.1604 **4.07**
NW ROD (3*)	2.750 **69.85**	2.625 **66.68**	0.375 **9.53**	1.375 **34.93**	2.312 **58.72**	0.1651 **4.19**	0.1590 **4.04**	0.1627 **4.13**	0.1590 **4.04**

* Threads per inch.

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Longyear
DIAMOND CORE DRILLING DIMENSIONS, WEIGHTS and VOLUMES

DRILL RODS AND CASING

DRILL RODS

SIZE	O.D. (inches)	I.D. (inches)	WT. (lbs. per 10 ft.)	COUPLING I.D. (in.)	THREADS per inch	CONTENT (gal. per 100 feet)
E*	1-5/16	27-32	28	7/16	3	2.9
A*	1-5/8	1-1/8	38	9/16	3	5.2
B	1-29/32	1-13/32	46	5/8	5	8.1
N	2-3/8	2	49	1	4	16.3
RW*	1-3/32	23/32	19	13/32	4	2.1
EW*	1-3/8	7/8	31	1/2	3	3.1
AW*	1-23/32	1-7/32	41	5/8	3	6.1
BW	2-1/8	1-3/4	42	3/4	3	12.5
NW	2-5/8	2-1/4	54	1-3/8	3	20.7
HW	3-1/2	3-1/16	85	2-3/8	3	38.3

* Parallel Wall

FLUSH-COUPLED CASING

SIZE	O.D. (inches)	I.D. (inches)	WT. (lbs. per 10 ft.)	COUPLING I.D. (in.)	THREADS per inch	CONTENT (gal. per 100 feet)
RX**	1-7/16	1-3/16	18	1-3/16	8	5.7
EX	1-13/16	1-5/8	18	1-1/2	8	10.8
AX	2-1/4	2	29	1-29/32	8	16.3
BX	2-7/8	2-9/16	47	2-3/8	8	26.7
NX	3-1/2	3-3/16	60	3	8	41.4
HX	4-1/2	4-1/8	90	3-15/16	5	69.4

** Formerly XRT

FLUSH-JOINT CASING

SIZE	O.D. (inches)	I.D. (inches)	WEIGHT lbs. per 10 ft.)	THREADS per inch	CONTENT (gal. per 100 feet)
RW	1-7/16	1-3/16	18	5	5.7
EW	1-13/16	1-1/2	28	4	9.2
AW	2-1/4	1-29/32	38	4	14.8
BW	2-7/8	2-3/8	70	4	23.0
NW	3-1/2	3	86	4	36.7
HW	4-1/2	4	113	4	65.2

All dimensions, weights and volumes shown are nominal approximations in inches, pounds and U.S. gallons.

WIRE LINE DRILL RODS

SERIES "Q" WIRE LINE "WEDG-LOK" DRILL RODS

SIZE	O.D. (inches)	I.D. (inches)	WEIGHT lbs. per 10 ft.)	THREADS per inch	CONTENT (gal. per 100 feet)
AQ	1-3/4	1-3/8	31	4	7.7
BQ	2-3/16	1-13/16	40	3	13.4
NQ	2-3/4	2-3/8	51	3	23.0
HQ	3-1/2	3-1/16	77	3	38.2
PQ	4-5/8 *	4-1/16	103 **	3	67.4

* Coupling O.D.

* With Coupling

SERIES "CQ" COMPOSITE WIRE LINE DRILL RODS

SIZE	O.D. (inches)	ROD BODY I.D. (inches)	TOOL JOINT I.D. (inches)	WEIGHT (lbs. per 10 feet)	THREADS per inch	CONTENT (gal. per 100 feet)
BCQ	2-3/16	1-7/8	1-13/16	34.5	3	14.2
NCQ	2-3/4	2-7/16	2-3/8	44.0	3	24.1
HCQ	3-1/2	3-3/16	3-1/16	57.3	3	41.1
PCQ	4-5/8	4-1/4	4	102.8	3	71.6

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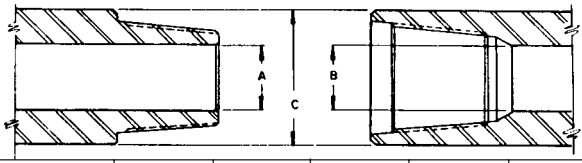
TOOL JOINTS RECOMMENDED MAXIMUM / MINIMUM DIMENSIONS



Size	Joints Type	Nom O.D.	Nom I.D.	A Max.	B Max.	C Min.	C Max.
2-3/8	A.P.I. Reg.	3-1/8	1	1-1/8	1-5/8	2-15/16	3-1/4
	A.P.I. I.F.	3-3/8	1-3/4	1-3/4	2	3-3/16	3-5/8
	Acme Reg.	3-1/8	1	1-1/8	1-3/8	2-15/16	3-1/4
	Hydril I.F.	3-3/8	1-3/4	1-3/4	1-7/8	3-1/8	3-5/8
2-7/8	A.P.I. Reg.	3-3/4	1-1/4	1-3/8	1-7/8	3-1/2	4
	A.P.I. F.H.	4-1/4	2-1/8	2-1/8	2-3/8	4-1/16	4-5/8
	A.P.I. I.F.	4-1/8	2-1/8	2-1/8	2-1/2	3-7/8	4-3/8
	Acme Reg.	3-3/4	1-1/4	1-5/16	1-5/8	3-1/2	4-1/8
	Hydril I.F.	3-7/8	2-1/8	2-3/16	2-3/16	3-5/8	4-1/8
	Hughes Xtra Hole	4-1/4	1-7/8	2-1/8	2-1/8	4	4-3/8
	Reed Db'l Str'mline	3-1/4	1-1/4	1-1/4	1-3/4	3	3-1/2
3	Union Tool	4-1/4	1-1/2	1-1/2	2-1/8	3-3/4	4-1/2
3-1/2	A.P.I. Reg.	4-1/4	1-1/2	1-3/4	2-1/4	4	4-5/8
	A.P.I. F.H.	4-5/8	2-7/16	2-7/16	2-3/4	4-1/2	5
	A.P.I. I.F.	4-3/4	2-11/16	2-11/16	3	4-1/2	5
	Acme Reg.	4-1/4	1-3/4	1-7/8	2-1/4	4	4-5/8
	Acme Streamline	4-5/8	2-7/16	2-7/16	2-3/4	4-1/2	5
	Hydril I.F.	4-1/2	2-3/4	2-3/4	2-13/16	4-3/8	4-7/8
	Hughes Xtra Hole	4-3/4	2-7/16	2-7/16	2-3/4	4-1/2	5
	Reed Ext. Fl - FH	3-5/8	1-1/2	1-1/2	1-3/4	3-1/2	4-1/8
	Reed Dbl Str'mline	3-7/8	1-13/16	1-13/16	2-1/8	3-3/4	4-1/4
4	A.P.I. F.H.	5-1/4	2-13/16	2-13/16	3-1/4	5	5-3/8
	A.P.I I.F.	5-3/4	3-5/32	3-3/32	3-1/2	5-1/2	6
	Reed Dbl Str'mline	4-1/2	2-3/8	2-3/8	2-5/8	4-1/4	4-3/4
	Union Tool	5-3/4	2-1/4	2-7/8	3-1/2	5-3/8	6
4-1/2	A.P.I. Reg.	5-3/4	2-1/4	2-5/8	3-1/4	5-3/8	6
	A.P.I. F.H.	5-3/4	3	3-5/32	3-1/2	5-1/2	6
	A.P.I. I.F.	6-1/8	3-3/4	3-3/4	4-1/8	5-7/8	6-1/2
	Acme Reg.	5-1/2	2-1/2	2-11/16	3-1/8	5-3/8	6
	Acme Streamline	5-3/4	3	3	3-3/8	5-1/2	6-1/8
	Hydril I.F.	6	3-3/4	3-7/8	4	5-13/16	6-1/4
	Hughes Xtra Hole	6	3-1/4	3-1/4	3-3/8	5-5/8	6-1/4
	Reed Dbl Str'mline	5	2-11/16	2-11/16	3	4-3/4	5-1/2
5	Reed Dbl Str'mline	5-5/8	3-3/8	3-3/8	3-3/4	5-1/2	6
	Hydril I.F.	6-5/8	4-3/16	4-1/4	4-3/8	6-1/2	7
5-1/2	A.P.I. Reg. or U.T.	6-3/4	2-3/4	3-1/4	3-7/8	6-3/8	7
	A.P.I. F.H.	7	4	4	4-1/2	6-1/2	7-1/4
	A.P.I. I.F.	7-3/8	4-13/16	4-13/16	5-1/4	7-1/8	7-7/8
	Acme Reg.	6-3/4	3	3-1/4	4	6-3/8	7
	Acme Streamline	7	4	4	4-3/8	6-11/16	7-1/4
	Reed Dbl Str'mline	6-1/8	3-3/4	3-3/4	4	5-7/8	6-3/4
6-5/8	A.P.I. Reg. or U.T.	7-3/4	3-1/2	4	4-3/4	7-1/8	7-7/8
	A.P.I. F.H.	8	5	5	5-1/2	7-1/2	8-1/4
	A.P.I. I.F.	8-1/2	5-29/32	5-29/32	6-1/4	8-3/8	9
	Acme Reg.	7-3/4	3-1/2	3-7/8	4-5/8	7-3/8	8
7-5/8	A.P.I. Reg.	8-7/8	4	4-1/4	5-1/4	8-1/8	9
8-5/8	A.P.I. Reg.	10	4-3/4	5-1/4	6-1/4	9	10-1/8

All sizes in inches.

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TOOL JOINT MECHANICAL PROPERTIES

Thread Type	O.D.	I.D.	Tension Yield Strength	Torsion Yield Strength	Recomm. Make-Up Torque
	in **mm**	in **mm**	lbs **daN**	ft.lbs **N.m**	ft.lbs **N.m**
1 AM M.T.	1 9/16 **39.7**	3/4 **19.1**	51,300 **22,800**	560 **750**	320 **430**
	1 9/16 **39.7**	13/16 **20.6**	42,800 **19,000**	470 **630**	260 **350**
1 1/4 AM M.T.	1 3/4 **44.5**	1 **25.4**	51,500 **22,900**	630 **850**	350 **470**
	1 3/4 **44.5**	7/8 **22.2**	71,700 **31,800**	880 **1,190**	500 **670**
	1 3/4 **44.5**	13/16 **20.6**	80,800 **35,900**	1,000 **1,350**	570 **770**
	1 3/4 **44.5**	3/4 **19.1**	89,300 **39,700**	1,070 **1,450**	610 **820**
1 1/2 AM M.T.	2 **50.8**	1 **25.4**	98,300 **43,700**	1,360 **1,840**	770 **1,040**
	2 **50.8**	1 5/32 **29.4**	69,200 **30,700**	950 **1,280**	540 **730**
	2 **50.8**	1 1/8 **28.6**	75,400 **33,500**	1,030 **1,390**	590 **790**
	2 **50.8**	1 1/16 **27.0**	87,200 **38,700**	1,200 **1,620**	680 **920**
1 AM M.T. - DSI	1 9/16 **39.7**	3/4 **19.1**	54,400 **24,100**	1,120 **1,510**	360 **480**
1 1/4 AM M.T. - DSI	1 3/4 **44.5**	7/8 **22.2**	75,300 **33,400**	1,340 **1,810**	560 **750**
1 1/2 AM M.T. - DSI	2 **50.8**	1 **25.4**	105,800 **47,000**	2,180 **2,950**	850 **1,150**
2 1/16 AM M.T. - DSI	2.330 **59.2**	1 1/4 **31.8**	112,700 **50,100**	3,420 **4,630**	1,000 **1,350**
1 13/16 Homco F.J.	1 13/16 **46.0**	3/4 **19.1**	100,700 **44,700**	1,210 **1,640**	690 **930**
2 3/8 Homco F.J.	2 1/2 **63.5**	1 **25.4**	192,000 **85,400**	3,190 **4,320**	1,810 **2,450**
1 13/16 Wilson F.J.	1 13/16 **46.0**	3/4 **19.1**	116,900 **51,900**	1,220 **1,650**	690 **930**
2 3/8 Wilson F.J.	2 1/2 **63.5**	1 1/16 **27.0**	173,100 **76,900**	2,810 **3,800**	1,600 **2,160**
2 L.D.C. (Argus A9SG)	2.0 **50.8**	1.0 **25.4**	114,900 **51,100**	1,300 **1,760**	700 **940**
1 9/16 Homco Slimline	1 9/16 **39.7**	15/16 **23.8**	63,000 **28,000**	700 **940**	400 **540**
1 13/16 Homco Slimline	1 13/16 **46.0**	1 **25.4**	89,800 **39,900**	1,140 **1,540**	650 **880**
2 3/8 AM PAC	2 7/8 **73.0**	1 3/8 **34.9**	212,900 **94,700**	4,280 **5,800**	3,400 **4,600**

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TOOL JOINT MECHANICAL PROPERTIES

Thread Type	O.D.	I.D.	Tension Yield Strength	Torsion Yield Strength	Recomm. Make-Up Torque
	in **mm**	in **mm**	lbs **daN**	ft.lbs **N.m**	ft.lbs **N.m**
2 7/8 AM PAC	3 1/8 **79.4**	1 1/4 **31.8**	303,500 **135,000**	6,240 **8,460**	4,960 **6,720**
	3 1/8 **79.4**	1 1/2 **38.1**	244,100 **108,500**	5,210 **7,060**	4,150 **5,620**
3 1/2 AM PAC	3 3/4 **95.3**	2 **50.8**	316,300 **140,600**	7,900 **10,710**	6,280 **8,510**
2 3/8 AM PAC DSI+	2 7/8 **73.0**	1 1/2 **38.1**	185,000 **82,200**	5,940 **8,050**	2,970 **4,020**
2 7/8 AM PAC DSI+	3 1/8 **79.4**	1 1/2 **38.1**	247,000 **109,800**	6,680 **9,050**	3,340 **4,520**
2 7/8 AM O.H.	3 7/8 **98.4**	2.151 **54.6**	310,900 **138,200**	8,000 **10,840**	4,540 **6,150**
2 7/8 AM O.H. LW	3 3/4 **95.3**	2 7/16 **61.9**	197,300 **87,700**	5,030 **6,810**	2,860 **3,870**
2 3/8 FEDP	3 1/8 **79.4**	1 1/4 **31.8**	257,500 **114,500**	5,350 **7,250**	3,040 **4,120**
2 7/8 HEF	3 1/8 **79.4**	1 1/8 **28.6**	301,600 **134,100**	5,960 **8,080**	3,390 **4,590**
	3 1/8 **79.4**	1 1/4 **31.8**	276,000 **122,700**	5,440 **7,370**	3,090 **4,180**
2 3/8 HT SL-H90	3 1/8 **79.4**	1.976 **50.2**	178,200 **79,200**	6,410 **8,690**	3,850 **5,210**
2 3/8 SL-H90	3 1/8 **79.4**	1 13/16 **46.0**	242,100 **107,600**	5,200 **7,050**	2,660 **3,600**
	3 1/4 **82.6**	2 **50.8**	180,300 **80,200**	4,650 **6,300**	2,370 **3,210**
2 7/8 SL-H90	4 1/4 **108.0**	1 3/4 **44.5**	481,300 **214,000**	14,550 **19,720**	7,430 **10,070**
	4 1/2 **114.3**	2 **50.8**	400,300 **178,000**	12,020 **16,290**	6,140 **8,320**
3 1/2 SL-H90	4 3/4 **120.7**	2 **50.8**	760,000 **338,000**	24,100 **32,670**	12,310 **16,690**
	4 3/4 **120.7**	2 3/4 **69.9**	452,200 **201,100**	15,860 **21,500**	8,100 **10,980**
2 3/8 API REG DSI+	3 1/8 **79.4**	1 **25.4**	344,200 **153,100**	7,370 **9,990**	3,680 **4,980**
2 3/8 API Reg.	3 1/8 **79.4**	1 **25.4**	332,400 **147,800**	5,320 **7,210**	3,020 **4,090**
2 7/8 API Reg.	3 3/4 **95.3**	1 1/4 **31.8**	438,600 **195,000**	10,140 **13,740**	5,760 **7,800**
3 1/2 API Reg.	4 1/4 **108.0**	1 1/2 **38.1**	623,200 **277,200**	13,870 **18,800**	7,880 **10,680**
	4 5/8 **117.5**	2 3/16 **55.6**	404,100 **179,700**	10,650 **14,430**	6,050 **8,200**

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TOOL JOINT MECHANICAL PROPERTIES

Thread Type	O.D.	I.D.	Tension Yield Strength	Torsion Yield Strength	Recomm. Make-Up Torque
	in **mm**	in **mm**	lbs **daN**	ft.lbs **N.m**	ft.lbs **N.m**
4 1/2 API Reg.	5 1/2 **139.7**	2 1/4 **57.2**	1,087,500 **483,700**	27,410 **37,160**	15,570 **21,110**
5 1/2 API Reg.	6 3/8 **161.9**	2 3/4 **69.9**	1,538,900 **684,500**	37,770 **51,200**	21,460 **29,090**
6 5/8 API Reg.	7 3/4 **196.9**	3 1/2 **88.9**	1,622,900 **721,900**	75,490 **102,350**	42,890 **58,150**
	7 3/4 **196.9**	2 13/16 **71.4**	1,997,800 **888,600**	93,880 **127,280**	53,340 **72,310**
	7 3/4 **196.9**	3 **76.2**	1,903,700 **846,800**	89,230 **120,970**	50,700 **68,730**
7 5/8 API Reg.	9 **228.6**	3 3/4 **95.3**	2,455,300 **1,092,100**	131,170 **177,840**	74,520 **101,030**
8 5/8 API Reg.	10 **254.0**	3 3/4 **95.3**	3,605,800 **1,603,900**	192,440 **260,910**	109,340 **148,240**
2 3/8 API I.F. (NC26)	3 1/2 **88.9**	1 1/4 **31.8**	408,000 **181,400**	8,100 **10,980**	4,600 **6,230**
	3 3/8 **85.7**	1 3/4 **44.5**	278,400 **123,800**	6,300 **8,540**	3,580 **4,850**
2 7/8 API I.F. (NC31)	4 1/8 **104.8**	2 **50.8**	443,400 **197,200**	12,060 **16,350**	6,850 **9,280**
	4 1/8 **104.8**	2 1/8 **54.0**	398,900 **177,400**	10,800 **14,640**	6,140 **8,320**
3 1/2 API I.F. (NC38)	4 3/4 **120.7**	2 **50.8**	803,600 **357,400**	17,570 **23,820**	9,980 **13,530**
	4 3/4 **120.7**	2 1/4 **57.2**	711,800 **316,600**	17,570 **23,820**	9,980 **13,530**
	4 3/4 **120.7**	2 11/16 **68.3**	525,100 **233,500**	16,560 **22,450**	9,410 **12,750**
4 API I.F. (NC46)	6 **152.4**	3 1/4 **82.6**	809,900 **360,200**	30,450 **41,280**	17,300 **23,450**
4 1/2 API I.F. (NC50)	6 3/8 **161.9**	3 3/4 **95.3**	843,200 **375,000**	34,160 **46,310**	19,410 **26,310**
	6 5/8 **168.3**	3 3/4 **95.3**	843,200 **375,000**	34,160 **46,310**	19,410 **26,310**
5 1/2 API I.F.	7 3/8 **187.3**	4 13/16 **122.2**	1,138,500 **506,400**	55,490 **75,230**	31,520 **42,730**
6 5/8 API I.F.	8 1/2 **215.9**	5 29/32 **150.0**	1,329,300 **591,300**	74,950 **101,610**	42,580 **57,730**
2 7/8 SH	3 3/8 **85.7**	1 3/4 **44.5**	278,400 **123,800**	6,300 **8,540**	3,580 **4,850**
3 1/2 S.H.	4 1/8 **104.8**	2 1/8 **54.0**	398,900 **177,400**	10,800 **14,640**	6,140 **8,320**
4 S.H.	4 5/8 **117.5**	2 9/16 **65.1**	456,900 **203,200**	13,770 **18,660**	7,820 **10,600**

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TOOL JOINT MECHANICAL PROPERTIES

Thread Type	O.D.	I.D.	Tension Yield Strength	Torsion Yield Strength	Recomm. Make-Up Torque
	in **mm**	in **mm**	lbs **daN**	ft.lbs **N.m**	ft.lbs **N.m**
2 7/8 X-Hole	4 1/4 **108.0**	1 7/8 **47.6**	452,200 **201,100**	12,040 **16,320**	6,840 **9,270**
3 1/2 X-Hole	4 3/4 **120.7**	2 7/16 **61.9**	510,900 **227,200**	15,460 **20,960**	8,780 **11,900**
4 1/2 X-Hole	6 1/4 **158.8**	3 1/4 **82.6**	809,900 **360,200**	30,450 **41,280**	17,300 **23,450**
5 X-Hole	6 3/8 **161.9**	3 3/4 **95.3**	843,200 **375,000**	34,160 **46,310**	19,410 **26,310**
3 1/2 API F.H.	4 5/8 **117.5**	2 1/8 **54.0**	711,200 **316,300**	14,920 **20,220**	8,480 **11,490**
4 API F.H. (NC40)	5 3/4 **146.1**	2 13/16 **71.4**	638,100 **283,800**	21,340 **28,930**	12,120 **16,430**
4 1/2 API F.H.	5 3/4 **146.1**	3 **76.2**	871,100 **387,400**	31,500 **42,700**	17,900 **24,260**
	6 1/4 **158.8**	2 1/2 **63.5**	1,108,700 **493,100**	40,520 **54,930**	23,020 **31,210**
5 1/2 API F.H.	7 **177.8**	4 **101.6**	1,140,800 **507,400**	51,040 **69,200**	29,000 **39,310**
6 5/8 API F.H.	8 **203.2**	5 **127.0**	1,304,800 **580,400**	67,120 **91,000**	38,130 **51,690**
	8 1/4 **209.6**	4 3/4 **120.7**	1,515,400 **674,000**	78,340 **106,210**	44,510 **60,340**
3 1/2 D.S.L.	3 7/8 **98.4**	1 13/16 **46.0**	472,100 **210,000**	8,960 **12,140**	5,090 **6,900**
3 1/2 H-90	5 **127.0**	2 3/4 **69.9**	594,900 **264,600**	21,480 **29,120**	10,970 **14,870**
	5 1/4 **133.4**	2 3/4 **69.9**	594,900 **264,600**	21,480 **29,120**	10,970 **14,870**
4 H-90	5 1/2 **139.7**	2 13/16 **71.4**	822,400 **365,800**	32,360 **43,870**	16,530 **22,410**
4 1/2 H-90	6 **152.4**	3 **76.2**	978,900 **435,400**	41,200 **55,850**	21,050 **28,530**
	6 **152.4**	3 1/4 **82.6**	843,900 **375,300**	35,330 **47,900**	18,050 **24,470**
	6 1/2 **165.1**	2 13/16 **71.4**	1,073,000 **477,200**	45,330 **61,450**	23,150 **31,380**
5 H-90	6 1/2 **165.1**	2 13/16 **71.4**	1,290,100 **573,800**	57,540 **78,010**	29,400 **39,860**
5 1/2 H-90	7 **177.8**	3 1/4 **82.6**	1,290,700 **574,100**	60,240 **81,670**	30,780 **41,730**

NOTE:
Tensile / Torsion Values are based on 110,000 psi material yield strength.
Tensile Yield values are based on pin failure at zero torque.

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ROTARY SHOULDER CONNECTIONS INTERCHANGE LIST

Common Name		Threads per in.	Taper in/ft	Same as or interchanges with
Style	Size			
A.P.I. Internal Flush (I.F.)	2 3/8	4	2	2 7/8 Slim Hole N.C.26
	2 7/8	4	2	3 1/2 Slim Hole N.C. 31
	3 1/2	4	2	4 1/2 Slim Hole N.C. 38 3 1/2 Reed Wide Open (W.O.)
	4	4	2	4 1/2 Extra Hole N.C.46 4 Reed Wide Open (W.O.)
	4 1/2	4	2	5" Extra Hole N.C. 50 5 1/2 Double Streamline 4 1/2 Reed Wide Open (W.O.)
A.P.I. Full Hole (F.H.)	4	4	2	4 1/2 Reed Double Streamline N.C.40
A.P.I.Extra Hole (X.H.) (E.H.) Hughes Extra Hole Reed Extra Hole	2 7/8	4	2	3 1/2 Double Streamline
	3 1/2	4	2	4 Slim Hole 4 External Flush 4 1/2 F.H. Reed External Flush
	4 1/2	4	2	4 Internal Flush N.C.46 5 Double Streamline 4 Reed Wide Open (W.O.)
	5	4	2	4 1/2 Internal Flush N.C.50 5 1/2 Double Streamline 4 1/2 Reed Wide Open (W.O.)
A.P.I Slim Hole (S.H.) Hughe Slim Hole Reed Slim Hole	2 7/8	4	2	2 3/8 Internal Flush N.C.26
	3 1/2	4	2	2 7/8 Internal Flush N.C.31
	4	4	2	3 1/2 Extra Hole 4 1/2 External Flush
	4 1/2	4	2	3 1/2 Internal Flush N.C.38 3 1/2 Reed Wide Open (W.O.)

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ROTARY SHOULDER CONNECTIONS INTERCHANGE LIST

Common Name		Threads per in.	Taper in/ft	Same as or interchanges with
Style	**Size**			
Double Streamline (DSL)	3 1/2	4	2	2 7/8 Extra Hole 3 1/2 Double Streamline
	4 1/2	4	2	4 Full Hole N.C.40
	5	4	2	4 Internal Flush 4 Reed Wide Open (W.O.) 4 1/2 Xtra Hole
	5 1/2	4	2	4 1/2 Internal Flush 5 Extra Hole N.C.50
Numbered Connection (N.C.)	26	4	2	2 3/8 Internal Flush 2 7/8 Slim Hole
	31	4	2	2 7/8 Internal Flush 3 1/2 Slim Hole
	38	4	2	3 1/2 Internal Flush 4 1/2 Slim Hole
	40	4	2	4 Full Hole 4 1/2 Double Streamline
	46	4	2	4 Internal Flush 4 1/2 Extra Hole
	50	4	2	4 1/2 Internal Flush 5 Extra Hole 5 1/2 Double Streamline
A.P.I External Flush (E.F) Hughes External Flush Reed External Flush	2 3/8	4	2	2 3/8 Homco External Flush
	3 1/2	4	2	3 1/2 F.H. Reed External Flush
	4 1/2	4	2	4 Slim Hole 3 1/2 Extra Hole 4 1/2 F.H. Reed External Flush
API Regular	5 1/2	4	3	5 Union Regular
	6 5/8	4	2	5 Union Tool F.H. 6 Union Tool Regular
Reed Open Hole, Reed Full Opening	2 3/8	4	1 1/2	2 3/8 American Open Hole
	2 7/8	4	1 1/2	2 7/8 American Open Hole
	3 1/2	4	1 1/2	3 1/2 American Open Hole
	4	4	1 1/2	4 American Open Hole

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SECTION 19

TUBING DATA

Page

API Tubing Requirements and Lengths ..... 2 - 3

Tubing Dimensional Data ..... 4 - 7

Tubing Performance Properties ..... 8 - 23

Maximum Hook Load On Tubing ..... 24 - 27

Dimensional Data On Selected Heavy Weight & Non-API Tubing ..... 28 - 40

Performance Data On Selected Heavy Weight & Non-API Tubing ..... 41 - 53

Fibreglass Tubing ..... 54 - 60

Coiled Tubing ..... 61 - 65

Dimensional Data On Special Tubing ..... 66 - 77

Make-Up Torque ..... 78 - 94

Drift Information For Tubing 95

Drift Information For Bare & Coated Tubing 96

Classification Of Used Tubing Work Strings ..... 97 - 98

Interchangeability Of 10 Rd Integral Tubing Thread 99

1996 Tubing Design Tables ..... 100 - 121

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TUBING

DIMENSIONAL / PERFORMANCE DATA

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API TUBING REQUIREMENTS

Tolerances on Dimensions and Weight				
Outside Diameter	(D)	Tolerance	Range	
			Minimum	Maximum
	4" & Smaller 4 1/2" & Larger	±0.031" +1%D, -0.5% D	D - 0.031" D - D x 0.005	D + 0.031" D + D x 0.01
Wall Thickness	The tolerance on wall thickness is 12.5%. Minimum wall thickness= t - 0.125 x t			
Inside Diameter	The inside diameter is governed by the outside diameter and weight tolerance			
Weight	Tolerances for single lengths are +6.5% ,-3.5%. The tolerance for carload lots is -1.75%. A carload is considered to be a minimum of 40,000pounds (18,144kg).			

Drift Test		
Tubing[(b)] Size	Drift Mandrel Length	Drift Mandrel Diameter
2 7/8" (73.02mm) & Smaller	42" (1.07m)	I.D. Minus 3/32" (2.38mm)
Larger than 2 7/8" (73.02mm)	42" (1.07mm)	I.D. MINUS 1/8" (3.17mm)
(b) Integral-joint tubing shall be tested before upsetting with a drift mandrel as shown, and shall also be drift tested at the pin end, after upsetting with a cylindrical drift mandrel 42 inches in length and Diu -0.015 inches in diameter. See Table 24, column 6, of API Specifcation 5CT, Fifth Edition, April 1, 1995 Manual.		

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Tubing Range Lengths		
Tubing		
	Range 1 ft (m)	**Range 2** ft (m)
Range Length (b) Minimum	20.0 (6.10)	28.0 (8.53)
Range Length Maximum	24.0 (7.32)	32.0 (9.75)
Range Length (a) or 100% of carload: Permissible variation within the range length, maximum	2.0 (.61)	2.0 (.61)
Pup Joints		
Lengths (c) ---- 2,3,4,6,8,10,and 12 feet (.609, .914, 1.219, 1.829, 2.438, 3.048, 3.658)		
Tolerance---+3 inches (+.76mm)		

(a) Carload tolerances shall not apply to orders of less than a carload. For any carload of pipe shipped to the final destination without the final transfer or removal from the car , the tolerance shall apply to each car. For any order consisting of more than a carload and shipped from the manufacturer's facility by rail, but not to the final destination, the car load tolerance shall apply to the total order but not to the individual carloads.
(b) By agreement between the purchaser and the manufacturer, the total range length for Range 1 tubing may be 20 - 28 feet (6.096 - 8.534 m)
(c) Two-foot pup joints may be furnised up to 3 feet long by agreement between the purchaser and the manufacturer , and lengths other than those listed may be furnished by agreement between the purchaser and the manufacturer.

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NON UPSET (NUE) TUBING DIMENSIONAL DATA

API Size O.D.		Nom. Size	Weight per ft. Plain End		Weight per ft. T & C		Wall Thickness		Inside Diameter		Drift Diameter		Coupling Diameter		Min. Coupling Length		Male Thrd Length		# Thrds per inch
in	mm	in	lb/ft	kg/m	lb/ft	kg/m	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	
1.050	26.7	3/4"	1.13	1.682	1.14	1.697	0.113	2.87	0.824	20.93	0.730	18.54	1.313	33.35	3 3/16	80.96	1.094	27.79	10
1.050	26.7	3/4"	1.47	2.188	1.48	2.202	0.154	3.91	0.742	18.85	0.648	16.46	1.313	33.35	3 3/16	80.96	1.094	27.79	10
1.315	33.4	1"	1.68	2.500	1.70	2.530	0.133	3.38	1.049	26.64	0.955	24.26	1.660	42.16	3 1/4	82.55	1.125	28.58	10
1.315	33.4	1"	2.17	3.229	2.19	3.259	0.179	4.55	0.957	24.31	0.863	21.92	1.660	42.16	3 1/4	82.55	1.125	28.58	10
1.660	42.2	1 1/4"	2.27	3.378	2.30	3.423	0.140	3.56	1.380	35.05	1.286	32.66	2.054	52.17	3 1/2	88.90	1.250	31.75	10
1.660	42.2	2 1/4"	3.00	4.464	3.03	4.509	0.191	4.85	1.278	32.46	1.184	30.07	2.054	52.17	3 1/2	88.90	1.250	31.75	10
1.900	48.3	1 1/2"	2.72	4.048	2.75	4.092	0.145	3.68	1.610	40.89	1.516	38.51	2.200	55.88	3 3/4	95.25	1.375	34.93	10
1.900	48.3	2 1/2"	3.63	5.402	3.65	5.432	0.200	5.08	1.500	38.10	1.406	35.71	-	-	-	-	-	-	-
1.900	48.3	1 1/2"	4.41	6.563	4.42	6.578	0.250	6.35	1.400	35.56	1.306	33.17	-	-	-	-	-	-	-
1.900	48.3	1 1/2"	5.13	7.634	5.15	7.664	0.300	7.62	1.300	33.02	1.206	30.63	-	-	-	-	-	-	-
2.063	52.4	1 3/4"	4.42	6.578	4.50	6.697	0.225	5.72	1.613	40.97	1.519	38.58	-	-	-	-	-	-	-
2 3/8	60.3	2"	3.94	5.863	4.00	5.953	0.167	4.24	2.041	51.84	1.947	49.45	2.875	73.03	4 1/4	107.95	1.625	41.28	10
2 3/8	60.3	2"	4.43	6.593	4.60	6.846	0.190	4.83	1.995	50.67	1.901	48.29	2.875	73.03	4 1/4	107.95	1.625	41.28	10
2 3/8	60.3	2"	5.75	8.557	5.80	8.631	0.254	6.45	1.867	47.42	1.773	45.03	2.875	73.03	4 1/4	107.95	1.625	41.28	10
2 3/8	60.3	2"	6.55	9.747	6.60	9.822	0.295	7.49	1.785	45.34	1.691	42.95	-	-	-	-	-	-	-
2 3/8	60.3	2"	7.32	10.89	7.35	10.938	0.336	8.53	1.703	43.26	1.609	40.87	-	-	-	-	-	-	-
2 7/8	73.0	2 1/2"	6.16	9.167	6.40	9.524	0.217	5.51	2.441	62.00	2.347	59.61	3.500	88.90	5 1/8	130.18	2.063	52.40	10
2 7/8	73.0	2 1/2"	7.66	11.4	7.80	11.608	0.276	7.01	2.323	59.00	2.229	56.62	3.500	88.90	5 1/8	130.18	2.063	52.40	10
2 7/8	73.0	2 1/2"	8.44	12.56	8.60	12.798	0.308	7.82	2.259	57.38	2.165	54.99	3.500	88.90	5 1/8	130.18	2.063	52.40	10
2 7/8	73.0	2 1/2"	9.21	13.71	9.35	13.914	0.340	8.64	2.195	55.75	2.101	53.37	-	-	-	-	-	-	-
2 7/8	73.0	2 1/2"	10.40	15.48	10.50	15.626	0.392	9.96	2.091	53.11	1.997	50.72	-	-	-	-	-	-	-
2 7/8	73.0	2 1/2"	11.44	17.02	11.50	17.114	0.440	11.18	1.995	50.67	1.901	48.29	-	-	-	-	-	-	-

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NON UPSET (NUE) TUBING DIMENSIONAL DATA ...(continued)

API Size O.D.		Nom. Size	Weight per ft. Plain End		Weight per ft. T & C		Wall Thickness		Inside Diameter		Drift Diameter		Coupling Diameter		Min. Coupling Length		Male Thrd Length		# Thrds per inch
in	**mm**	in	lb/ft	**kg/m**	lb/ft	**kg/m**	in	**mm**	in	**mm**	in	**mm**	in	**mm**	in	**mm**	in	**mm**	
3 1/2	**88.9**	3"	7.58	**11.28**	7.70	**11.459**	0.216	**5.49**	3.068	**77.93**	2.943	**74.75**	4.250	**107.95**	5 5/8	**142.88**	2.313	**58.75**	10
3 1/2	**88.9**	3"	8.81	**13.11**	9.20	**13.691**	0.254	**6.45**	2.992	**76.00**	2.867	**72.82**	4.250	**107.95**	5 5/8	**142.88**	2.313	**58.75**	10
3 1/2	**88.9**	3"	9.91	**14.75**	10.20	**15.179**	0.289	**7.34**	2.922	**74.22**	2.797	**71.04**	4.250	**107.95**	5 5/8	**142.88**	2.313	**58.75**	10
3 1/2	**88.9**	3"	12.52	**18.63**	12.70	**18.900**	0.375	**9.53**	2.750	**69.85**	2.625	**66.68**	4.250	**107.95**	5 5/8	**142.88**	2.313	**58.75**	10
3 1/2	**88.9**	3"	14.10	**20.98**	14.30	**21.281**	0.430	**10.92**	2.640	**67.06**	2.515	**63.88**	-	**-**	-	**-**	-	**-**	-
3 1/2	**88.9**	3"	15.37	**22.87**	15.50	**23.067**	0.476	**12.09**	2.548	**64.72**	2.423	**61.54**	-	**-**	-	**-**	-	**-**	-
3 1/2	**88.9**	3"	16.81	**25.02**	17.00	**25.299**	0.530	**13.46**	2.440	**61.98**	2.315	**58.80**	-	**-**	-	**-**	-	**-**	-
4	**101.6**	3 1/2"	9.11	**13.56**	9.50	**14.138**	0.226	**5.74**	3.548	**90.12**	3.423	**86.94**	4.750	**120.65**	5 3/4	**146.05**	2.375	**60.33**	8
4	**101.6**	3 1/2"	12.93	**19.24**	13.20	**19.644**	0.330	**8.38**	3.340	**84.84**	3.215	**81.66**	-	**-**	-	**-**	-	**-**	-
4	**101.6**	3 1/2"	15.89	**23.65**	16.10	**23.959**	0.415	**10.54**	3.170	**80.52**	3.045	**77.34**	-	**-**	-	**-**	-	**-**	-
4	**101.6**	3 1/2"	18.69	**27.81**	18.90	**28.126**	0.500	**12.70**	3.000	**76.20**	2.875	**73.03**	-	**-**	-	**-**	-	**-**	-
4	**101.6**	3 1/2"	22.09	**32.87**	22.20	**33.037**	0.610	**15.49**	2.780	**70.61**	2.655	**67.44**	-	**-**	-	**-**	-	**-**	-
4 1/2	**114.3**	4"	12.24	**18.22**	12.60	**18.751**	0.271	**6.88**	3.958	**100.53**	3.833	**97.36**	5.200	**132.08**	6 1/8	**155.58**	2.563	**65.10**	8
4 1/2	**114.3**	4"	14.98	**22.29**	15.20	**22.620**	0.337	**8.56**	3.826	**97.18**	3.701	**94.01**	-	**-**	-	**-**	-	**-**	-
4 1/2	**114.3**	4"	16.72	**24.88**	17.00	**25.299**	0.380	**9.65**	3.740	**95.00**	3.615	**91.82**	-	**-**	-	**-**	-	**-**	-
4 1/2	**114.3**	4"	18.69	**27.81**	18.90	**28.126**	0.430	**10.92**	3.640	**92.46**	3.515	**89.28**	-	**-**	-	**-**	-	**-**	-
4 1/2	**114.3**	4"	21.36	**31.79**	21.50	**31.996**	0.500	**12.70**	3.500	**88.90**	3.375	**85.73**	-	**-**	-	**-**	-	**-**	-
4 1/2	**114.3**	4"	23.56	**35.06**	23.70	**35.269**	0.560	**14.22**	3.380	**85.85**	3.255	**82.68**	-	**-**	-	**-**	-	**-**	-
4 1/2	**114.3**	4"	26.04	**38.75**	26.10	**38.841**	0.630	**16.00**	3.240	**82.30**	3.115	**79.12**	-	**-**	-	**-**	-	**-**	-

REFERENCES : API 5C2, 21 st Edition (October 1999) / API 5CT , 5 th Edition (April 1, 1995) / API STD 5B, 13 th Edition (May 31, 1988)

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UPSET TUBING (EUE) DIMENSIONAL DATA

API Size O.D.		Wt./Ft. T & C		Wall Thickness		Inside Diam. I.D.		Drift Diameter		Reg. Cplg. Diameter		Spec. Cplg Diameter		Min. Cplg. Length		Upset Diameter		Upset Length		Male Thrd Length		Thrds per inch
in	**mm**	lb/ft	**kg/m**	in	**mm**	in	**mm**	in	**mm**	in	**mm**	in	**mm**	in	**mm**	in	**mm**	in	**mm**	in	**mm**	
1.050	**26.7**	1.20	**1.79**	0.113	**2.87**	0.824	**20.93**	0.730	**18.54**	1.660	**42.16**	-	**-**	3 1/4	**82.55**	1.315	**33.40**	2 3/8	**60.33**	1.125	**28.58**	10
1.050	**26.7**	1.54	**2.29**	0.154	**3.91**	0.742	**18.85**	0.648	**16.46**	1.660	**42.16**	-	**-**	3 1/4	**82.55**	1.315	**33.40**	2 3/8	**60.33**	1.125	**28.58**	10
1.315	**33.4**	1.80	**2.68**	0.133	**3.38**	1.049	**26.64**	0.955	**24.26**	1.900	**48.26**	-	**-**	3 1/2	**88.90**	1.469	**37.31**	2 1/2	**63.50**	1.250	**31.75**	10
1.315	**33.4**	2.24	**3.33**	0.179	**4.55**	0.957	**24.31**	0.863	**21.92**	1.900	**48.26**	-	**-**	3 1/2	**88.90**	1.469	**37.31**	2 1/2	**63.50**	1.250	**31.75**	10
1.660	**42.2**	2.40	**3.57**	0.140	**3.56**	1.380	**35.05**	1.286	**32.66**	2.200	**55.88**	-	**-**	3 3/4	**95.25**	1.812	**46.02**	2 5/8	**66.68**	1.375	**34.93**	10
1.660	**42.2**	3.07	**4.57**	0.191	**4.85**	1.278	**32.46**	1.184	**30.07**	2.200	**55.88**	-	**-**	3 3/4	**95.25**	1.812	**46.02**	2 5/8	**66.68**	1.375	**34.93**	10
1.900	**48.3**	2.90	**4.32**	0.145	**3.68**	1.610	**40.89**	1.516	**38.51**	2.500	**63.50**	-	**-**	3 7/8	**98.43**	2.094	**53.19**	2 11/16	**68.26**	1.438	**36.53**	10
1.900	**48.3**	3.73	**5.55**	0.200	**5.08**	1.500	**38.10**	1.406	**35.71**	2.500	**63.50**	-	**-**	-	**-**	2.094	**53.19**	2 11/16	**68.26**	1.438	**36.53**	10
2 3/8	**60.3**	4.70	**6.99**	0.190	**4.83**	1.995	**50.67**	1.901	**48.29**	3.063	**77.80**	2.91	**73.91**	4 7/8	**123.83**	2.594	**65.89**	4	**101.60**	1.938	**49.23**	8
2 3/8	**60.3**	5.95	**8.85**	0.254	**6.45**	1.867	**47.42**	1.773	**45.03**	3.063	**77.80**	2.91	**73.91**	4 7/8	**123.83**	2.594	**65.89**	4	**101.60**	1.938	**49.23**	8
2 3/8	**60.3**	7.45	**11.09**	0.336	**8.53**	1.703	**43.26**	1.609	**40.87**	3.063	**77.80**	2.91	**73.91**	4 7/8	**123.83**	2.594	**65.89**	4	**101.60**	1.938	**49.23**	8
2 7/8	**73.0**	6.50	**9.67**	0.217	**5.51**	2.441	**62.00**	2.347	**59.61**	3.668	**93.17**	3.46	**87.88**	5 1/4	**133.35**	3.094	**78.59**	4 1/4	**107.95**	2.125	**53.98**	8
2 7/8	**73.0**	7.90	**11.76**	0.276	**7.01**	2.323	**59.00**	2.229	**56.62**	3.668	**93.17**	3.46	**87.88**	5 1/4	**133.35**	3.094	**78.59**	4 1/4	**107.95**	2.125	**53.98**	8
2 7/8	**73.0**	8.70	**12.95**	0.308	**7.82**	2.259	**57.38**	2.165	**54.99**	3.668	**93.17**	3.46	**87.88**	5 1/4	**133.35**	3.094	**78.59**	4 1/4	**107.95**	2.125	**53.98**	8
2 7/8	**73.0**	9.45	**14.06**	0.340	**8.64**	2.195	**55.75**	2.101	**53.37**	3.668	**93.17**	3.46	**87.88**	5 1/4	**133.35**	3.094	**78.59**	4 1/4	**107.95**	2.125	**53.98**	8
3 1/2	**88.9**	9.30	**13.84**	0.254	**6.45**	2.992	**76.00**	2.867	**72.82**	4.500	**114.30**	4.18	**106.17**	5 3/4	**146.05**	3.750	**95.25**	4 1/2	**114.30**	2.375	**60.33**	8
3 1/2	**88.9**	12.95	**19.27**	0.375	**9.53**	2.750	**69.85**	2.625	**66.68**	4.500	**114.30**	4.18	**106.17**	5 3/4	**146.05**	3.750	**95.25**	4 1/2	**114.30**	2.375	**60.33**	8
4	**101.6**	11.00	**16.37**	0.262	**6.65**	3.476	**88.29**	3.351	**85.12**	5.000	**127.00**	-	**-**	6	**152.40**	4.250	**107.95**	4 1/2	**114.30**	2.500	**63.50**	8
4 1/2	**114.3**	12.75	**18.97**	0.271	**6.88**	3.958	**100.53**	3.833	**97.36**	5.563	**141.30**	-	**-**	6 1/4	**158.75**	4.750	**120.65**	4 3/4	**120.65**	2.625	**66.68**	8

REFERENCES: API 5C2, 21 st Edition (October 1999) / API 5CT , 5 th Edition (April 1, 1995) / API STD 5B, 13 th Edition (May 31, 1988)

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INTEGRAL JOINT (IJ) TUBING DIMENSIONAL DATA

API Size O.D.		Wt./Ft. T & C		Wall Thickness		Inside Diameter		Drift Diameter		O.D. of box		Box Length		Male Thrd Length		# Thrds per inch
in	**mm**	lb/ft	**kg/m**	in	**mm**	in	**mm**	in	**mm**	in	**mm**	in	**mm**	in	**mm**	
1.315	**33.4**	1.72	**2.560**	0.133	**3.38**	1.049	**26.64**	0.955	**24.26**	1.550	**39.37**	1.750	**44.45**	1.125	**28.58**	10
1.660	**42.2**	2.10	**3.125**	0.125	**3.18**	1.410	**35.81**	1.316	**33.43**	1.880	**47.75**	1.875	**47.63**	1.250	**31.75**	10
1.660	**42.2**	2.33	**3.467**	0.140	**3.56**	1.380	**35.05**	1.286	**32.66**	1.880	**47.75**	1.875	**47.63**	1.250	**31.75**	10
1.900	**48.3**	2.40	**3.572**	0.125	**3.18**	1.650	**41.91**	1.556	**39.52**	2.110	**53.59**	2.000	**50.80**	1.375	**34.93**	10
1.900	**48.3**	2.76	**4.107**	0.145	**3.68**	1.610	**40.89**	1.516	**38.51**	2.110	**53.59**	2.000	**50.80**	1.375	**34.93**	10
2.063	**52.4**	3.25	**4.837**	0.156	**3.96**	1.751	**44.48**	1.657	**42.09**	2.325	**59.06**	2.125	**53.98**	1.438	**36.53**	10

REFERENCES: API 5C2, 21 st Edition (October 1999) / API 5CT , 5 th Edition (April 1, 1995) / API STD 5B, 13 th Edition (May 31, 1988)

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TUBING PERFORMANCE PROPERTIES UPSET (EUE) TUBING

API Size O.D.		Mat. Grade	Nom. Weight Upset		Collapse Pressure		Internal Yield Pressure						Joint Yield Strength					
							Plain End		Upset Reg. Cpl.		Upset Spec Cpl		Pipe Body Yield		Upset Reg Cpl		Upset Spec Cpl	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN	lb	daN
1.050	26.7	H-40	1.20	1.786	7680	52952	7530	51918	7530	51918	-	-	13320	5925	13320	5925	-	-
		H-40	1.54	2.292	10010	69017	10270	70809	9420	64949	-	-	17320	7704	17320	7704	-	-
		J-55	1.20	1.786	10560	72809	10360	71430	10360	71430	-	-	18320	8149	18320	8149	-	-
		J-55	1.54	2.292	13770	94941	14120	97354	12950	89287	-	-	23820	10596	23820	10596	-	-
		C-75	1.20	1.786	14410	99353	14130	97423	14130	97423	-	-	24900	11076	24950	11098	-	-
		L-80	1.20	1.786	15370	105972	15070	103904	15070	103904	-	-	26640	11850	26640	11850	-	-
		L-80	1.54	2.292	20020	138033	20530	141549	18840	129897	-	-	34640	15409	34640	15409	-	-
		C-90	1.20	1.786	17290	119210	16950	116866	16950	116866	-	-	29970	13331	29970	13331	-	-
		C-90	1.54	2.292	22530	155339	23100	159269	21200	146169	-	-	38970	17335	38970	17335	-	-
		T-95	1.20	1.786	18250	125829	17890	123347	17890	123347	-	-	31640	14074	31640	14074	-	-
		T-95	1.54	2.292	23780	163957	24380	168094	22380	154305	-	-	41140	18300	41140	18300	-	-
		P-110	1.54	2.292	27530	189813	28230	194639	25910	178643	-	-	47630	21187	47630	21187	-	-
1.315	33.4	H-40	1.80	2.679	7270	50125	7080	48815	7080	48815	-	-	19760	8790	19760	8790	-	-
		H-40	2.24	3.333	9410	64880	9530	65707	9530	65707	-	-	25560	11370	25560	11370	-	-
		J-55	1.80	2.679	10000	68948	9730	67086	9730	67086	-	-	27170	12086	27170	12086	-	-
		J-55	2.24	3.333	12940	89218	13100	90321	13100	90321	-	-	35150	15636	35150	15636	-	-
		C-75	1.80	2.679	13640	94044	13270	91493	13270	91493	-	-	37000	16458	37040	16476		-
		L-80	1.80	2.679	14550	100319	14160	97630	14160	97630	-	-	39520	17579	39520	17579	-	-
		L-80	2.24	3.333	18810	129690	19060	131414	19060	131414		-	51120	22739	51120	22739	-	-
		C-90	1.80	2.679	16360	112798	15930	109833	15930	109833	-	-	44460	19777	44460	19777	-	-
		C-90	2.24	3.333	21170	145962	21440	147824	21440	147824	-	-	57510	25582	57510	25582	-	-
		T-95	1.80	2.679	17270	119072	16810	115901	16810	115901	-	-	46930	20876	46930	20876	-	-
		T-95	2.24	3.333	22340	154029	22630	156028	22630	156028	-	-	60710	27005	60710	27005	-	-
		P-110	2.24	3.333	25870	178367	26200	180643	26200	180643	-	-	70290	31267	70290	31267	-	-

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TUBING PERFORMANCE PROPERTIES UPSET (EUE) TUBING…(continued)

API Size O.D.		Mat. Grade	Nom. Weight Upset		Collapse Pressure		Internal Yield Pressure						Joint Yield Strength					
							Plain End		Upset Reg. Cpl.		Upset Spec Cpl		Pipe Body Yield		Upset Reg Cpl		Upset Spec Cpl	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN	lb	daN	lb	daN
1.660	42.2	H-40	2.40	3.572	6180	42610	5900	40679	5900	40679	-	-	26760	11903	26760	11903	-	-
		H-40	3.07	4.569	8150	56192	8050	55503	8050	55503	-	-	35240	15676	35240	15676	-	-
		J-55	2.40	3.572	8490	58536	8120	55985	8120	55985	-	-	36800	16369	36800	16369	-	-
		J-55	3.07	4.569	11200	77221	11070	76325	11070	76325	-	-	48460	21556	48460	21556	-	-
		C-75	2.40	3.572	11580	79841	11070	76325	11070	76325	-	-	50100	22286	50140	22303	-	-
		L-80	2.40	3.572	12360	85219	11810	81427	11810	81427	-	-	53520	23807	53520	23807	-	-
		L-80	3.07	4.569	16290	112316	16110	111075	16110	111075	-		70480	31351	70480	31351	-	
		C-90	2.40	3.572	13900	95837	13280	91562	13280	91562	-	-	60210	26783	60210	26783	-	-
		C-90	3.07	4.569	18330	126381	18120	124933	18120	124933	-	-	79290	35270	79290	35270	-	-
		T-95	2.40	3.572	14670	101146	14020	96664	14020	96664	-	-	63560	28273	63560	28273	-	-
		T-95	3.07	4.569	19350	133414	19130	131897	19130	131897	-	-	83700	37232	83700	37232	-	-
		P-110	3.07	4.569	22400	154443	22150	152719	22150	152719	-	-	96910	43108	96910	43108	-	-
1.900	48.3	H-40	2.90	4.316	5640	38886	5340	36818	5340	36818	-	-	31960	14217	31960	14217	-	-
		H-40	3.73	5.551	7530	51918	7370	50814	7370	50814	-	-	42720	19003	42720	19003	-	-
		J-55	2.90	4.316	7750	53434	7350	50676	7350	50676	-	-	43950	19550	43950	19550	-	-
		J-55	3.73	5.551	10360	71430	10130	69844	10130	69844	-	-	58740	26129	58740	26129	-	-
		C-75	2.90	4.316	10570	72878	10020	69085	10020	69085	-	-	60000	26689	59960	26672	-	-
		L-80	2.90	4.316	11280	77773	10680	73636	10680	73636	-	-	63920	28433	63920	28433	-	-
		L-80	3.73	5.551	15070	103904	14740	101629	14740	101629	-	-	85440	38006	85440	38006	-	-
		C-90	2.90	4.316	12620	87012	12020	82875	12020	82875	-	-	71910	31987	71910	31987	-	-
		C-90	3.73	5.551	16950	116866	16580	114315	16580	114315	-	-	96120	42756	96120	42756	-	-
		T-95	2.90	4.316	13190	90942	12690	87494	12690	87494	-	-	75910	33766	75910	33766	-	-
		T-95	3.73	5.551	17890	123347	17500	120658	17500	120658	-	-	101460	45132	101460	45132	-	-
		P-110	3.73	5.551	20720	142859	20260	139688	20260	139688	-	-	117480	52258	117480	52258	-	-

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TUBING PERFORMANCE PROPERTIES UPSET (EUE) TUBING…(continued)

API Size O.D.		Mat. Grade	Nom. Weight Upset		Collapse Pressure		Internal Yield Pressure						Joint Yield Strength					
							Plain End		Upset Reg. Cpl.		Upset Spec Cpl		Pipe Body Yield		Upset Reg Cpl		Upset Spec Cpl	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN	lb	daN	lb	daN
2 3/8	60.3	H-40	4.70	6.994	5890	40610	5600	38611	5600	38611	5600	38611	52200	23220	52200	23220	52200	23220
		J-55	4.70	6.994	8100	55848	7700	53090	7700	53090	7700	53090	71700	31894	71700	31894	71700	31894
		C-75	4.70	6.994	11040	76118	10500	72395	10500	72395	10500	72395	97820	43513	97800	43504	97800	43504
		C-75	5.95	8.855	14330	98802	14040	96802	13930	96044	10720	73912	126940	56466	126900	56448	126900	56448
		L-80	4.70	6.994	11780	81220	11200	77221	11200	77221	11200	77221	104300	46395	104300	46395	104300	46395
		L-80	5.95	8.855	15280	105352	14970	103215	14860	102456	11440	78876	135400	60229	135400	60229	135400	60229
		L-80	7.45	11.087	19430	133965	19810	136585	14860	102456	11440	78876	172200	76598	172200	76598	141300	62853
		C-90	4.70	6.994	13250	91356	12600	86874	12600	86874	12600	86874	117400	52222	117400	52222	117400	52222
		C-90	5.95	8.855	17190	118521	16840	116108	16720	115280	12870	88736	152300	67746	152300	67746	152300	67746
		C-90	7.45	11.087	21860	150719	22280	153615	16720	115280	12870	88736	193700	86162	193700	86162	159000	70727
		T-95	4.70	6.994	13980	96389	13300	91700	13300	91700	13300	91700	123900	55113	123900	55113	123900	55113
		T-95	5.95	8.855	18150	125140	17780	122589	17650	121692	13580	93631	160700	71483	160700	71483	160700	71483
		T-95	7.45	11.087	23080	159131	23520	162165	17650	121692	13580	93631	204400	90922	204400	90922	167800	74641
		P-105	4.70	6.994	15460	106593	14700	101353	14700	101353	14700	101353	136900	60896	136900	60896	136900	60896
		P-105	5.95	8.855	20060	138309	19650	135482	19540	134724	15010	103490	177700	79045	177700	79045	177700	79045
		P-110	4.70	6.994	16130	111212	15400	106179	15400	106179	15400	106179	143400	63788	143400	63788	143400	63788
		P-110	5.95	8.855	21010	144859	20590	141963	20430	140860	15730	108455	186100	82781	186100	82781	186100	82781
2 7/8	73.0	H-40	6.50	9.673	5580	38473	5280	36404	5280	36404	5280	36404	72500	32250	72500	32250	72500	32250
		J-55	6.50	9.673	7680	52952	7260	50056	7260	50056	7260	50056	99700	44349	99700	44349	99700	44349
		C-75	6.50	9.673	10470	72188	9910	68327	9910	68327	9910	68327	135900	60451	135900	60451	135900	60451
		C-75	7.90	11.756	13020	89770	12600	86874	12600	86874	10340	71292	169000	75175	169020	75184	169000	75175
		C-75	8.70	12.947	14350	98940	14060	96940	14010	96596	10340	71292	186300	82870	186290	82866	181200	80602

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TUBING PERFORMANCE PROPERTIES UPSET (EUE) TUBING…(continued)

API Size O.D.		Mat. Grade	Nom. Weight Upset		Collapse Pressure		Internal Yield Pressure						Joint Yield Strength					
							Plain End		Upset Reg. Cpl.		Upset Spec Cpl		Pipe Body Yield		Upset Reg Cpl		Upset Spec Cpl	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN	lb	daN	lb	daN
2 7/8	73.0	L-80	6.50	**9.673**	11170	**77014**	10570	**72878**	10570	**72878**	10570	**72878**	145000	**64499**	145000	**64499**	145000	**64499**
		L-80	7.90	**11.756**	13890	**95768**	13440	**92666**	13440	**92666**	11030	**76049**	180300	**80201**	180300	**80201**	180300	**80201**
		L-80	8.70	**12.947**	15300	**105490**	15000	**103421**	14940	**103008**	11030	**76049**	198700	**88386**	198700	**88386**	193100	**85895**
		L-80	9.45	**14.063**	16680	**115005**	16560	**114177**	14940	**103008**	11030	**76049**	216600	**96348**	216600	**96348**	193100	**85895**
		C-90	6.50	**9.673**	12380	**85357**	11890	**81979**	11890	**81979**	11890	**81979**	163100	**72551**	163100	**72551**	163100	**72551**
		C-90	7.90	**11.756**	15620	**107696**	15120	**104249**	15120	**104249**	12410	**85564**	202900	**90254**	202900	**90254**	202900	**90254**
		C-90	8.70	**12.947**	17220	**118728**	16870	**116315**	16810	**115901**	12410	**85564**	223600	**99462**	223600	**99462**	217300	**96660**
		C-90	9.45	**14.063**	18770	**129415**	18630	**128449**	16810	**115901**	12410	**85564**	243700	**108403**	243700	**108403**	217300	**96660**
		T-95	6.50	**9.673**	12940	**89218**	12550	**86529**	12550	**86529**	12550	**86529**	172100	**76554**	172100	**76554**	172100	**76554**
		T-95	7.90	**11.756**	16490	**113695**	15960	**110040**	15960	**110040**	13100	**90321**	214100	**95236**	214100	**95236**	214100	**95236**
		T-95	8.70	**12.947**	18170	**125278**	17810	**122796**	17740	**122313**	13100	**90321**	236000	**104978**	236000	**104978**	229400	**102042**
		T-95	9.45	**14.063**	19810	**136585**	19660	**135551**	17740	**122313**	13100	**90321**	257300	**114453**	257300	**114453**	229400	**102042**
		P-105	6.50	**9.673**	14010	**96596**	13870	**95630**	13870	**95630**	13870	**95630**	190300	**84650**	190300	**84650**	190300	**84650**
		P-105	7.90	**11.756**	18220	**125622**	17640	**121624**	17640	**121624**	14480	**99836**	236600	**105245**	236600	**105245**	236600	**105245**
		P-105	8.70	**12.947**	20090	**138516**	19690	**135758**	19610	**135206**	14480	**99836**	260800	**116010**	260800	**116010**	253700	**112851**
		P-110	6.50	**9.673**	14550	**100319**	14530	**100181**	14530	**100181**	14530	**100181**	199300	**88653**	199300	**88653**	199300	**88653**
		P-110	7.90	**11.756**	19090	**131621**	18480	**127415**	18480	**127415**	15160	**104525**	247900	**110271**	247900	**110271**	247900	**110271**
		P-110	8.70	**12.947**	21040	**145066**	20620	**142170**	20540	**141618**	15160	**104525**	273200	**121525**	273200	**121525**	265600	**118145**
3 1/2	88.9	H-40	9.30	**13.840**	5380	**37094**	5080	**35025**	5080	**35025**	5080	**35025**	103600	**46084**	103600	**46084**	103600	**46084**
		J-55	9.30	**13.840**	7400	**51021**	6990	**48194**	6990	**48194**	6990	**48194**	142500	**63387**	142500	**63387**	142500	**63387**
		C-75	9.30	**13.840**	10040	**69223**	9530	**65707**	9530	**65707**	9530	**65707**	194300	**86429**	194260	**86411**	194300	**86429**
		C-75	12.95	**19.272**	14350	**98940**	14060	**96940**	14060	**96940**	9990	**68879**	276100	**122815**	276120	**122824**	256000	**113874**
		L-80	9.30	**13.840**	10540	**72671**	10160	**70051**	10160	**70051**	10160	**70051**	207200	**92167**	207200	**92167**	207200	**92167**
		L-80	12.95	**19.272**	15310	**105559**	15000	**103421**	15000	**103421**	10660	**73498**	294600	**131045**	294600	**131045**	273100	**121481**
		C-90	9.30	**13.840**	11570	**79772**	11430	**78807**	11430	**78807**	11430	**78807**	233100	**103688**	233100	**103688**	233100	**103688**
		C-90	12.95	**19.272**	17220	**118728**	16880	**116383**	16880	**116383**	11990	**82668**	331400	**147414**	331400	**147414**	307300	**136694**

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TUBING PERFORMANCE PROPERTIES UPSET (EUE) TUBING…(continued)

API Size O.D.		Mat. Grade	Nom. Weight Upset		Collapse Pressure		Internal Yield Pressure						Joint Yield Strength					
							Plain End		Upset Reg. Cpl.		Upset Spec Cpl		Pipe Body Yield		Upset Reg Cpl		Upset Spec Cpl	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN	lb	daN	lb	daN
3 1/2	88.9	T-95	9.30	13.840	12080	83289	12070	83220	12070	83220	12070	83220	246000	109426	246000	109426	24600	10943
		T-95	12.95	19.272	18180	125347	17810	122796	17810	122796	12660	87288	349800	155599	349800	155599	324300	144256
		P-105	9.30	13.840	13050	89977	13340	91976	13340	91976	13340	91976	272000	120992	272000	120992	272000	120992
		P-105	12.95	19.272	20090	138516	19690	135758	19690	135758	13990	96458	386600	171968	386600	171968	358300	159380
		P-110	9.30	13.840	13530	93286	13970	96320	13970	96320	13970	96320	284900	126730	284900	126730	284900	126730
		P-110	12.95	19.272	21050	145135	20630	142239	20630	142239	14660	101077	405000	180153	405000	180153	375500	167031
4	101.6	H-40	11.00	16.370	4900	33784	4590	31647	4590	31647	-	-	123100	54758	123100	54758	-	-
		J-55	11.00	16.370	6590	45436	6300	43437	6300	43437	-	-	169200	75264	169200	75264	-	-
		C-75	11.00	16.370	8410	57985	8600	59295	8600	59295	-	-	230800	102665	230800	102665	-	-
		L-80	11.00	16.370	8800	60674	9170	63225	9170	63225	-	-	246200	109515	246200	109515	-	-
		C-90	11.00	16.370	9590	66121	10320	71154	10320	71154	-	-	276900	123171	276900	123171	-	-
		T-95	11.00	16.370	9980	68810	10890	75084	10890	75084	-	-	292300	130022	292300	130022	-	-
4 1/2	114.3	H-40	12.75	18.974	4490	30957	4220	29096	4220	29096	-	-	144000	64054	144000	64054	-	-
		J-55	12.75	18.974	5730	39507	5800	39990	5800	39990	-	-	198000	88075	198000	88075	-	-
		C-75	12.75	18.974	7200	49642	7900	54469	7900	54469	-	-	270000	120102	270030	120115	-	-
		L-80	12.75	18.974	7500	51711	8430	58123	8430	58123	-	-	288000	128109	288000	128109	-	-
		C-90	12.75	18.974	8120	55985	9490	65431	9490	65431	-	-	324000	144122	324000	144122	-	-
		T-95	12.75	18.974	8410	57985	10010	69017	10010	69017	-	-	342000	152129	342000	152129	-	-

NOTE: All except C-75 & P-105 information taken from API Bulletin 5C2 Twenty First Edition, October 1999, Table 2 Pages 28 through 39.

C-75 & P-105 values taken from 5C2 Twentieth Edition, May 1987, Table 2 pages 18 through 23.

For Material Grade K-55, Use Performance values given under J-55 and for Material Grade N-80, Use Performance values given under L-80.

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TUBING PERFORMANCE PROPERTIES NON UPSET (NUE) TUBING

API Size O.D.		Mat. Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure Plain End		Internal Yield Pressure NUE		Pull Yield Strength Pipe Body Yield		Pull Yield Strength NUE Joint	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN
1.050	26.7	H-40	1.14	1.697	7680	52952	7530	51918	7530	51918	13320	5925	6360	2829
		H-40	1.48	2.202	10010	69017	10270	70809	9340	64397	17300	7695	10390	4622
		J-55	1.14	1.697	10560	72809	10360	71430	10360	71430	18320	8149	8690	3866
		J-55	1.48	2.202	13770	94941	14120	97354	12840	88529	23800	10587	14290	6357
		C-75	1.14	1.697	14410	99353	14130	97423	14130	97423	24900	11076	11920	5302
		C-75	1.48	2.202	18770	129415	19250	132724	17520	120796	32500	14457	19480	8665
		L-80	1.14	1.697	15370	105972	15070	103904	15070	103904	26640	11850	12640	5623
		L-80	1.48	2.202	20020	138033	20530	141549	18680	128794	34700	15435	20780	9243
		C-90	1.14	1.697	17290	119210	16950	116866	16950	116866	29970	13331	14220	6325
		C-90	1.48	2.202	22530	155339	23100	159269	21020	144928	39000	17348	23380	10400
		T-95	1.14	1.697	18250	125829	17890	123347	17890	123347	31640	14074	15010	6677
		T-95	1.48	2.202	23780	163957	24380	168094	22190	152995	41200	18327	24680	10978
1.315	33.4	H-40	1.70	2.530	7270	50125	7080	48815	7080	48815	19760	8790	10920	4857
		H-40	2.19	3.259	9410	64880	9530	65707	9410	64880	25600	11387	16750	7451
		J-55	1.70	2.530	10000	68948	9730	67086	9730	67086	27170	12086	15020	6681
		J-55	2.19	3.259	12940	89218	13100	90321	12940	89218	35100	15613	23040	10249
		C-75	1.70	2.530	13640	94044	13270	91493	13270	91493	37000	16458	20540	9137
		C-75	2.19	3.259	17640	121624	17870	123209	17650	121692	47900	21307	31410	13972
		L-80	1.70	2.530	14550	100319	14160	97630	14160	97630	39520	17579	21840	9715
		L-80	2.19	3.259	18810	129690	19060	131414	18820	129759	51100	22730	33510	14906
		C-90	1.70	2.530	16360	112798	15930	109833	15930	109833	44460	19777	24570	10929
		C-90	2.19	3.259	21170	145962	21440	147824	21170	145962	57500	25577	37700	16770
		T-95	1.70	2.530	17270	119072	16810	115901	16810	115901	46930	20876	25940	11539
		T-95	2.19	3.259	22340	154029	22630	156028	22350	154098	60700	27001	39790	17699

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TUBING PERFORMANCE PROPERTIES NON UPSET (NUE) TUBING... (continued)

API Size O.D.		Mat. Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure Plain End		Internal Yield Pressure NUE		Pull Yield Strength Pipe Body Yield		Pull Yield Strength NUE Joint	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN
1.660	42.2	H-40	2.30	3.423	6180	42610	5900	40679	5900	40679	26760	11903	15480	6886
		H-90	3.03	4.509	8150	56192	8050	55503	8050	55503	35300	15702	24050	10698
		J-55	2.30	3.423	8490	58536	8120	55985	8120	55985	36800	16369	21290	9470
		J-55	3.03	4.509	11200	77221	11070	76325	11070	76325	48500	21574	33070	14710
		C-75	2.30	3.423	11580	79841	11070	76325	11070	76325	50100	22286	29120	12953
		C-75	3.03	4.509	15270	105283	15100	104111	15100	104111	66100	29403	45090	20057
		L-80	3.03	4.509	16290	112316	16110	111075	16110	111075	70500	31360	48100	21396
		C-90	2.30	3.423	13900	95837	13280	91562	13280	91562	60210	26783	34830	15493
		C-90	3.03	4.509	18330	126381	18120	124933	18120	124933	79300	35274	54110	24069
		T-95	2.30	3.423	14670	101146	14020	96664	14020	96664	63560	28273	36770	16356
		T-95	3.03	4.509	19350	133414	19130	131897	19130	131897	83700	37232	57120	25408
1.900	48.3	H-40	2.75	4.092	5640	38886	5340	36818	5340	36818	31960	14217	19040	8469
		H-40	3.65	5.432	7530	51918	7370	50814	6570	45299	42700	18994	29840	13273
		J-55	2.75	4.092	7750	53434	7350	50676	7350	50676	43950	19550	26180	11645
		J-55	3.65	5.432	10360	71430	10130	69844	9030	62260	58700	26111	41030	18251
		C-75	2.75	4.092	10570	72878	10020	69085	10020	69085	60000	26689	35800	15925
		C-75	3.65	5.432	14130	97423	13820	95286	12310	84874	80100	35630	55950	24888
		L-80	2.75	4.092	11280	77773	10680	73636	10680	73636	63920	28433	38080	16939
		L-80	3.65	5.432	15070	103904	14740	101629	13130	90528	85500	38032	59680	26547
		L-80	4.42	6.578	18280	126036	18420	127001	-	-	103680	46119	-	-
		L-80	5.15	7.664	21270	146651	22110	152443	-	-	120640	53663	-	-

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TUBING PERFORMANCE PROPERTIES NON UPSET (NUE) TUBING… (continued)

API Size O.D.		Mat. Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure Plain End		Internal Yield Pressure NUE		Pull Yield Strength Pipe Body Yield		Pull Yield Strength NUE Joint	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN
1.900	48.26	C-90	2.75	4.092	12620	87012	12020	82875	12020	82875	71910	31987	42840	19056
		C-90	3.65	5.432	16950	116866	16580	114315	14780	101905	96100	42747	67140	29865
		C-90	4.42	6.578	20570	141825	20720	142859	-	-	116640	51884	-	-
		C-90	5.15	7.664	23930	164992	24870	171473	-	-	135720	60371	-	-
		T-95	2.75	4.092	13190	90942	12690	87494	12690	87494	75910	33766	45220	20115
		T-95	3.65	5.432	17890	123347	17500	120658	15600	107558	101500	45149	70870	31525
		T-95	4.42	6.578	21710	149685	21880	150857	-	-	123120	54767	-	-
		T-95	5.15	7.664	25260	174162	26250	180987	-	-	143260	63725	-	-
2.063	52.4	H-40	4.50	6.697	7770	53572	7630	52607	-	-	52000	23131	-	-
		J-55	4.50	6.697	10690	73705	10500	72395	-	-	71400	31760	-	-
		L-80	4.50	6.697	15550	107213	15270	105283	-	-	103900	46217	-	-
		C-90	4.50	6.697	17490	120589	17180	118452	-	-	116900	52000	-	-
		T-95	4.50	6.697	18460	127277	18130	125002	-	-	123400	54891	-	-
		P-110	4.50	6.697	21380	147410	20990	144721	-	-	142900	63565	-	-
2 3/8	60.3	H-40	4.00	5.953	5230	36060	4920	33922	4920	33922	46300	20595	30100	13389
		H-40	4.60	6.846	5890	40610	5600	38611	5600	38611	52200	23220	35900	15969
		J-55	4.00	5.953	7190	49573	6770	46678	6770	46678	63700	28335	41400	18416
		J-55	4.60	6.846	8100	55848	7700	53090	7700	53090	71700	31894	49400	21974
		C-75	4.00	5.953	9520	65638	9230	63639	9230	63639	86900	38655	56500	25132
		C-75	4.60	6.846	11040	76118	10500	72395	10500	72395	97800	43504	67430	29994
		C-75	5.80	8.631	14330	98802	14040	96802	14040	96802	126900	56448	96550	42948

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TUBING PERFORMANCE PROPERTIES NON UPSET (NUE) TUBING… (continued)

API Size O.D.		Mat. Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure Plain End		Internal Yield Pressure NUE		Pull Yield Strength Pipe Body Yield		Pull Yield Strength NUE Joint	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN
2 3/8	60.3	L-80	4.00	5.953	9980	68810	9840	67844	9840	67844	92600	41191	60200	26778
		L-80	4.60	6.846	11780	81220	11200	77221	11200	77221	104300	46395	71800	31938
		L-80	5.80	8.631	15280	105352	14970	103215	14970	103215	135400	60229	102900	45772
		L-80	6.60	9.822	17410	120038	17390	119900	-	-	154200	68592	-	-
		L-80	7.35	10.938	19430	133965	19810	136585	-	-	172200	76598	-	-
		C-90	4.00	5.953	10940	75429	11070	76325	11070	76325	104200	46350	67700	30114
		C-90	4.60	6.846	13250	91356	12600	86874	12600	86874	117400	52222	80800	35942
		C-90	5.80	8.631	17190	118521	16840	116108	16840	116108	152300	67746	115700	51466
		C-90	6.60	9.822	19580	134999	19560	134861	-	-	173500	77177	-	-
		C-90	7.35	10.938	21860	150719	22280	153615	-	-	193700	86162	-	-
		T-95	4.00	5.953	11410	78669	11690	80600	-	-	110000	48930	-	-
		T-95	4.60	6.846	13980	96389	13300	91700	13300	91700	123900	55113	85300	37943
		T-95	5.80	8.631	18150	125140	17780	122589	17780	122589	160700	71483	122200	54357
		T-95	6.60	9.822	20670	142515	20650	142377	-	-	183200	81491	-	-
		T-95	7.35	10.938	23080	159131	23520	162165	-	-	204400	90922	-	-
		P-105	4.60	6.846	15460	106593	14700	101353	14700	101353	136900	60896	94400	41991
		P-105	5.80	8.631	20060	138309	19650	135482	19650	135482	177700	79045	135200	60140
		P-110	4.60	6.846	16130	111212	15400	106179	15400	106179	143400	63788	98800	43948
		P-110	5.80	8.631	21010	144859	20590	141963	20590	141963	186100	82781	141500	62942
2 7/8	73.0	H-40	6.40	9.524	5580	38473	5280	36404	5280	36404	72500	32250	52700	23442
		J-55	6.40	9.524	7680	52952	7260	50056	7260	50056	99700	44349	72500	32250

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TUBING PERFORMANCE PROPERTIES NON UPSET (NUE) TUBING… (continued)

API Size O.D.		Mat. Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure				Pull Yield Strength			
							Plain End		NUE		Pipe Body Yield		NUE Joint	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN
2 7/8	73.0	C-75	6.40	9.524	10470	72188	9910	68327	9910	68327	135900	60451	99000	44037
		C-75	7.80	11.608	13020	89770	12600	86874	12600	86874	169000	75175	132100	58761
		C-75	8.60	12.798	14350	98940	14060	96940	14060	96940	186300	82870	149400	66456
		L-80	6.40	9.524	11170	77014	10570	72878	10570	72878	145000	64499	105400	46884
		L-80	7.80	11.608	13890	95768	13440	92666	13440	92666	180300	80201	140700	62586
		L-80	8.60	12.798	15300	105490	15000	103421	15000	103421	198700	88386	159200	70816
		L-80	9.35	13.914	16680	115005	16560	114177	-	-	216600	96348	-	-
		L-80	10.50	15.626	18840	129897	19090	131621	-	-	244600	108804	-	-
		L-80	11.50	17.114	20740	142997	21430	147755	-	-	269300	119791	-	-
		C-90	6.40	9.524	12380	85357	11890	81979	11890	81979	163100	72551	118600	52756
		C-90	7.80	11.608	15620	107696	15120	104249	15120	104249	202900	90254	158300	70415
		C-90	8.60	12.798	17220	118728	16870	116315	16870	116315	223600	99462	179100	79668
		C-90	9.35	13.914	18770	129415	18630	128449	-	-	243700	108403	-	-
		C-90	10.50	15.626	21200	146169	21470	148030	-	-	275200	122415	-	-
		C-90	11.50	17.114	23330	160855	24100	166164	-	-	302900	134737	-	-
		T-95	6.40	9.524	12940	89218	12550	86529	12550	86529	172100	76554	125200	55692
		T-95	7.80	11.608	16490	113695	15960	110040	15960	110040	214100	95236	167100	74330
		T-95	8.60	12.798	18170	125278	17810	122796	17810	122796	236000	104978	189100	84116
		T-95	9.35	13.914	19810	136585	19660	135551	-	-	257300	114453	-	-
		T-95	10.50	15.626	22370	154236	22670	156304	-	-	290500	129221	-	-
		T-95	11.50	17.114	24630	169818	25440	175403	-	-	319800	142254	-	-

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TUBING PERFORMANCE PROPERTIES NON UPSET (NUE) TUBING… (continued)

API Size O.D.		Mat. Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure Plain End		Internal Yield Pressure NUE		Pull Yield Strength Pipe Body Yield		Pull Yield Strength NUE Joint	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN
2 7/8	73.0	P-105	6.40	9.524	14010	96596	13870	95630	13870	95630	190300	84650	138600	61652
		P-105	7.80	11.608	18220	125622	17640	121624	17640	121624	236600	105245	184900	82248
		P-105	8.60	12.798	20090	138516	19690	135758	19690	135758	260800	116010	209100	93012
		P-110	6.40	9.524	14550	100319	14530	100181	14530	100181	199300	88653	145000	64499
		P-110	7.80	11.608	19090	131621	18480	127415	18480	127415	247900	110271	193500	86073
		P-110	8.60	12.798	21040	145066	20620	142170	20620	142170	273200	121525	218900	97372
3 1/2	88.9	H-40	7.70	11.459	4630	31923	4320	29785	4320	29785	89100	39634	65000	28913
		H-40	9.20	13.691	5380	37094	5080	35025	5080	35025	103600	46084	79400	35319
		H-40	10.20	15.179	6060	41782	5780	39852	5780	39852	116600	51866	92500	41146
		J-55	7.70	11.459	5970	41162	5940	40955	5940	40955	122500	54491	89400	39767
		J-55	9.20	13.691	7400	51021	6990	48194	6990	48194	142500	63387	109200	48575
		J-55	10.20	15.179	8330	57433	7950	54813	7950	54813	160300	71305	127200	56581
		C-75	7.70	11.459	7540	51986	8100	55848	8100	55848	167100	74330	122010	54273
		C-75	9.20	13.691	10040	69223	9530	65707	9530	65707	194300	86429	149140	66341
		C-75	10.20	15.179	11360	78324	10840	74739	10840	74739	218700	97283	173550	77199
		C-75	12.70	18.900	14350	98940	14060	96940	14060	96940	276100	122815	230990	102749
		L-80	7.70	11.459	7870	54262	8640	59571	8640	59571	178200	79267	130000	57827
		L-80	9.20	13.691	10540	72671	10160	70051	10160	70051	207200	92167	158900	70682
		L-80	10.20	15.179	12120	83564	11560	79703	11560	79703	233200	103733	185000	82292
		L-80	12.70	18.900	15310	105559	15000	103421	15000	103421	294600	131045	246200	109515
		L-80	14.30	21.281	17240	118866	17200	118590	-	-	331800	147592	-	-

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TUBING PERFORMANCE PROPERTIES NON UPSET (NUE) TUBING… (continued)

API Size O.D.		Mat. Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure Plain End		Internal Yield Pressure NUE		Pull Yield Strength Pipe Body Yield		Pull Yield Strength NUE Joint	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN
3 1/2	88.9	L-80	15.50	23.067	18800	129621	19040	131276	-	-	361800	160937	-	-
		L-80	17.00	25.299	20560	141756	21200	146169	-	-	395600	175972	-	-
		C-90	7.70	11.459	8540	58881	9720	67017	9720	67017	200500	89187	146300	65077
		C-90	9.20	13.691	11570	79772	11430	78807	11430	78807	233100	103688	178700	79490
		C-90	10.20	15.179	13640	94044	13010	89701	13010	89701	262400	116721	208100	92567
		C-90	12.70	18.900	17220	118728	16880	116383	16880	116383	331400	147414	277000	123216
		C-90	14.30	21.281	19400	133758	19350	133414	-	-	373200	166008	-	-
		C-90	15.50	23.067	21150	145824	21420	147686	-	-	407000	181043	-	-
		C-90	17.00	25.299	23130	159476	23850	164440	-	-	445100	197990	-	-
		T-95	7.70	11.459	8850	61019	10260	70740	10260	70740	211700	94169	154400	68681
		T-95	9.20	13.691	12080	83289	12070	83220	12070	83220	246000	109426	188700	83938
		T-95	10.20	15.179	14390	99216	13730	94665	13730	94665	276900	123171	219600	97683
		T-95	12.70	18.900	18180	125347	17810	122796	17810	122796	349800	155599	292400	130066
		T-95	14.30	21.281	20480	141205	20430	140860	-	-	394000	175260	-	-
		T-95	15.50	23.067	22330	153960	22610	155890	-	-	429600	191096	-	-
		T-95	17.00	25.299	24410	168301	25170	173541	-	-	469800	208977	-	-
		P-105	9.20	13.691	13050	89977	13340	91976	13340	91976	272000	120992	208900	92923
		P-105	12.70	18.900	20090	138516	19690	135758	19690	135758	386600	171968	323400	143855
		P-110	9.20	13.691	13530	93286	13970	96320	13970	96320	284900	126730	218500	97194
		P-110	12.70	18.900	21050	145135	20630	142239	20630	142239	405000	180153	338600	150617

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TUBING PERFORMANCE PROPERTIES NON UPSET (NUE) TUBING… (continued)

API Size O.D.		Mat. Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure Plain End		Internal Yield Pressure NUE		Pull Yield Strength Pipe Body Yield		Pull Yield Strength NUE Joint	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN
4	101.6	H-40	9.50	14.138	4050	27924	3960	27303	3960	27303	107200	47685	72000	32027
		J-55	9.50	14.138	5110	35232	5440	37507	5440	37507	147400	65567	99000	44037
		C-75	9.50	14.138	6350	43782	7420	51159	7420	51159	201000	89409	135010	60055
		L-80	9.50	14.138	6590	45436	7910	54538	-	-	214400	95370	144000	64054
		L-80	13.20	19.644	12110	83496	11550	79634	-	-	304400	135404	-	-
		L-80	16.10	23.959	14880	102594	14530	100181	-	-	373900	166319	-	-
		L-80	18.90	28.126	17500	120658	17500	120658	-	-	439800	195633	-	-
		L-80	22.20	33.037	20680	142584	21350	147203	-	-	519800	231219	-	-
		C-90	9.50	14.138	7080	48815	8900	61363	8900	61363	241200	107291	162000	72061
		C-90	13.20	19.644	13620	93907	12990	89563	-	-	342500	152352	-	-
		C-90	16.10	23.959	16740	115418	16340	112660	-	-	420700	187137	-	-
		C-90	18.90	28.126	19690	135758	19690	135758	-	-	494800	220098	-	-
		C-90	22.20	33.037	23260	160372	24020	165612	-	-	584700	260088	-	-
		T-95	9.50	14.138	7310	50401	9390	64742	9390	64742	254600	113252	171000	76065
		T-95	13.20	19.644	14380	99147	13720	94596	-	-	361500	160803	-	-
		T-95	16.10	23.959	17670	121830	17250	118935	-	-	444000	197501	-	-
		T-95	18.90	28.126	20780	143273	20780	143273	-	-	522300	232331	-	-
		T-95	22.20	33.037	24560	169335	25350	174782	-	-	617200	274544	-	-
4 1/2	114.3	H-40	12.60	18.751	4490	30957	4220	29096	4220	29096	144000	64054	104400	46439
		J-55	12.60	18.751	5730	39507	5800	39990	5800	39990	198000	88075	143500	63832
		C-75	12.60	18.751	7200	49642	7900	54469	7900	54469	270000	120102	195680	87043

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TUBING PERFORMANCE PROPERTIES NON UPSET (NUE) TUBING… (continued)

API Size O.D.		Mat. Grade	Nom. Wt. T & C		Collapse Pressure		Internal Yield Pressure				Pull Yield Strength			
							Plain End		NUE		Pipe Body Yield		NUE Joint	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	dNa	lb	dNa
4 1/2	**114.3**	L-80	12.60	**18.751**	7500	**51711**	8430	**58123**	8430	**58123**	288000	**128109**	208700	**92834**
		L-80	15.20	**22.620**	11080	**76394**	10480	**72257**	-	**-**	352600	**156844**	-	**-**
		L-80	17.00	**25.299**	12370	**85288**	11820	**81496**	-	**-**	393400	**174993**	-	**-**
		L-80	18.90	**28.126**	13830	**95354**	13380	**92252**	-	**-**	439800	**195633**	-	**-**
		L-80	21.50	**31.996**	15800	**108937**	15560	**107282**	-	**-**	502600	**223568**	-	**-**
		L-80	23.70	**35.269**	17430	**120176**	17420	**120107**	-	**-**	554600	**246698**	-	**-**
		L-80	26.00	**38.692**	19260	**132793**	19600	**135137**	-	**-**	612800	**272587**	-	**-**
		C-90	12.60	**18.751**	8120	**55985**	9490	**65431**	9490	**65431**	324000	**144122**	234800	**104444**
		C-90	15.20	**22.620**	12220	**84254**	11800	**81358**	-	**-**	396600	**176416**	-	**-**
		C-90	17.00	**25.299**	13920	**95975**	13300	**91700**	-	**-**	442600	**196878**	-	**-**
		C-90	18.90	**28.126**	15560	**107282**	15050	**103766**	-	**-**	494800	**220098**	-	**-**
		C-90	21.50	**31.996**	17780	**122589**	17500	**120658**	-	**-**	565500	**251547**	-	**-**
		C-90	23.70	**35.269**	19610	**135206**	19600	**135137**	-	**-**	623900	**277525**	-	**-**
		C-90	26.00	**38.692**	21670	**149409**	22050	**152029**	-	**-**	689400	**306660**	-	**-**
		T-95	12.60	**18.751**	8410	**57985**	10010	**69017**	10010	**69017**	342000	**152129**	247900	**110271**
		T-95	15.20	**22.620**	12760	**87977**	12450	**85840**	-	**-**	418700	**186247**	-	**-**
		T-95	17.00	**25.299**	14690	**101284**	14040	**96802**	-	**-**	467200	**207821**	-	**-**
		T-95	18.90	**28.126**	16420	**113212**	15890	**109558**	-	**-**	522300	**232331**	-	**-**
		T-95	21.50	**31.996**	18770	**129415**	18470	**127346**	-	**-**	596900	**265514**	-	**-**
		T-95	23.70	**35.269**	20700	**142721**	20690	**142653**	-	**-**	658500	**292915**	-	**-**
		T-95	26.00	**38.692**	22880	**157752**	23280	**160510**	-	**-**	727700	**323697**	-	**-**

NOTE: All except C-75 & P-105 information taken from API Bulletin 5C2 Twenty First Edition, October 1999, Table 2 Pages 28 through 39. C-75 & P-105 values taken from 5C2 Twentieth Edition, May 1987, Table 2 pages 18 through 23.
For Material Grade K-55, Use Performance values given under J-55 and for Material Grade N-80, Use Performance values given under L-80.

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TUBING PERFORMANCE PROPERTIES INTEGRAL JOINT(IJ) TUBING

API Size O.D.		Mat. Grade	Nom. Weight Integral Joint		Collapse Pressure		Internal Yield Pressure				Joint Yield Strength			
							Plain End		Integral Joint		Pipe Body Yield		Integral Joint	
in	mm		lb/ft	kg/m	psi	kPa	psi	kPa	psi	kPa	lb	daN	lb	daN
1.315	33.4	H-40	1.72	2.560	7270	50125	7080	48815	7080	48815	19760	8790	15940	7090
		J-55	1.72	2.560	10000	68948	9730	67086	9730	67086	27170	12086	21910	9746
		C-75	1.72	2.560	13640	94044	13270	91493	13270	91493	37000	16458	29940	13318
		L-80	1.72	2.560	14550	100319	14160	97630	14160	97630	39520	17579	31870	14176
		C-90	1.72	2.560	16360	112798	15930	109833	15930	109833	44460	19777	35860	15951
		T-95	1.72	2.560	17270	119072	16810	115901	16810	115901	46930	20876	37850	16837
1.660	42.2	H-40	2.10	3.125	5570	38404	5270	36335	5270	36335	24120	10729	22230	9888
		H-40	2.33	3.467	6180	42610	5900	40679	5810	40059	26760	11903	22230	9888
		J-55	2.10	3.125	7660	52814	7250	49987	7250	49987	33170	14755	30560	13594
		J-55	2.33	3.467	8490	58536	8120	55985	7990	55089	36800	16369	30560	13594
		C-75	2.33	3.467	11580	79841	11070	76325	10900	75153	50100	22286	41600	18505
		L-80	2.33	3.467	12360	85219	11810	81427	11620	80117	53520	23807	44460	19777
		C-90	2.33	3.467	13900	95837	13280	91562	13070	90114	60210	26783	50010	22246
		T-95	2.33	3.467	14670	101146	14020	96664	13800	95148	63560	28273	52790	23482
1.900	48.3	H-40	2.40	3.572	4920	33922	4610	31785	4610	31785	27880	12402	26940	11984
		H-40	2.76	4.107	5640	38886	5340	36818	5140	35439	31960	14217	26940	11984
		J-55	2.40	3.572	6640	45781	6330	43644	6330	43644	38340	17054	37040	16476
		J-55	2.76	4.107	7750	53434	7350	50676	7060	48677	43950	19550	37040	16476
		C-75	2.76	4.107	10570	72878	10020	69085	9640	66465	60000	26689	50400	22419
		L-80	2.76	4.107	11280	77773	10680	73636	10270	70809	63920	28433	53880	23967
		C-90	2.76	4.107	12620	87012	12020	82875	11560	79703	71910	31987	60610	26961
		T-95	2.76	4.107	13190	90942	12690	87494	12200	84116	75910	33766	63980	28460

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TUBING PERFORMANCE PROPERTIES INTEGRAL JOINT(IJ) TUBING

API Size O.D.		Mat. Grade	Nom. Weight Integral Joint		Collapse Pressure		Internal Yield Pressure				Joint Yield Strength			
							Plain End		Integral Joint		Pipe Body Yield		Integral Joint	
in	**mm**		lb/ft	**kg/m**	psi	**kPa**	psi	**kPa**	psi	**kPa**	lb	**daN**	lb	**daN**
2.063		H-40	3.25	**4.837**	5590	**38542**	5290	**36473**	5090	**35094**	37400	**16636**	35800	**15925**
		J-55	3.25	**4.837**	7690	**53021**	7280	**50194**	7000	**48263**	51400	**22864**	49300	**21930**
		C-75	3.25	**4.837**	10480	**72257**	9920	**68396**	9559	**65907**	70100	**31182**	66900	**29759**
		L-80	3.25	**4.837**	11180	**77083**	10590	**73015**	10180	**70189**	74800	**33273**	71700	**31894**
		C-90	3.25	**4.837**	12420	**85633**	11910	**82117**	11460	**79014**	84200	**37454**	80700	**35897**
		T-95	3.25	**4.837**	12980	**89494**	12570	**86667**	12090	**83358**	88800	**39500**	85100	**37854**

NOTE: All except C-75 information taken from API Bulletin 5C2 Twenty First Edition, October 1999, Table 2 Pages 28 through 39.

C-75 values taken from 5C2 Twentieth Edition, May 1987, Table 2 pages 18 through 23.

For Material Grade K-55, Use Performance values given under J-55 and for Material Grade N-80, Use Performance values given under L-80.

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Hook-Load at Minimum Yield Strength For New, Premium Class (Used), And Class 2 (Used) Tubing Work Strings

NEW								PREMIUM CLASS					CLASS 2				
Size O.D.	W.T.	Orig. O.D.	Wall Thk.	I.D.	Orig. Cross-Section Area	Yield	Hook Lead	O.D. With 20% Wall Reduction	Min Remaining Wall (80%)	Reduced Cross-Section Area	Cross-Section Area Ratio	Hook Lead	O.D. With 30% Wall Reduction	Minimum Remaining Wall (70%)	Reduced Cross-Section Area	Cross-Section Area Ratio	Hook Lead
i.n.	lb/ft	i.n.	i.n.	i.n.	sq. in.	psi	lb	i.n.	i.n.	sq. in.	%	lb	i.n.	i.n.	sq. in.	%	lb
3/4	1.20	1.050	0.113	0.824	0.3326	55,000	18,295	1.0048	0.090	0.2597	78.07	14,283	0.9822	0.079	0.2244	67.47	12,343
						75,000	24,948					19,477					16,832
						80,000	26,611					20,775					17,954
						105,000	34,927					27,267					23,564
3/4	1.50	1.050	0.154	0.742	0.4335	55,000	23,842	0.9884	0.123	0.3349	77.25	18,418	0.9576	0.108	0.2878	66.39	15,829
						75,000	32,512					25,115					21,585
						80,000	34,679					26,790					23,024
						105,000	45,516					351,161					30,219
1	1.80	1.315	0.133	1.049	0.4939	55,000	27,163	1.2618	0.106	0.3862	78.20	21,242	1.2352	0.093	0.3340	67.64	18,372
						75,000	37,041					28,966					25,053
						80,000	39,510					30,897					26,724
						105,000	51,857					40,552					35,075
1	2.25	1.315	0.179	0.957	0.6388	55,000	35,135	1.2434	0.143	0.4950	77.48	27,222	1.2076	0.125	0.4260	66.69	23,432
						75,000	47,912					37,122					31,953
						80,000	51,106					39,596					34,083
						105,000	67,077					51,970					44,734
1 1/4	2.40	1.660	0.140	1.380	0.6685	55,000	36,769	1.6040	0.112	0.5250	78.53	28,873	1.5760	0.098	0.4550	68.07	25,027
						75,000	50,140					39,373					34,128
						80,000	53,482					41,988					36,403
						105,000	70,196					55,122					47,779
1 1/4	3.02	1.660	0.191	1.278	0.8815	55,000	48,481	1.5836	0.153	0.6868	77.92	37,776	1.5454	0.134	0.5930	67.27	32,613
						75,000	66,110					51,513					44,472
						80,000	70,517					54,947					47,437
						105,000	92,554					72,118					62,261
1 1/4	3.20	1.660	0.198	1.264	0.9094	55,000	50,018	1.5808	0.158	0.7078	77.83	38,930	1.5412	0.139	0.6107	67.16	33,590
						75,000	68,602					53,087					45,805
						80,000	72,753					56,626					48,858
						105,000	95,489					74,322					64,126

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Hook-Load at Minimum Yield Strength For New, Premium Class (Used), And Class 2 (Used) Tubing Work Strings... (continued)

NEW								PREMIUM CLASS					CLASS 2				
Size O.D.	W.T.	Orig. O.D.	Wall Thk.	I.D.	Orig. Cross-Section Area	Yield	Hook Lead	O.D. With 20% Wall Reduction	Min Remaining Wall (80%)	Reduced Cross-Section Area	Cross-Section Area Ratio	Hook Lead	O.D. With 30% Wall Reduction	Minimum Remaining Wall (70%)	Reduced Cross-Section Area	Cross-Section Area Ratio	Hook Lead
i.n.	lb/ft	i.n.	i.n.	i.n.	sq. in.	psi	lb	i.n.	i.n.	sq. in.	%	lb	i.n.	i.n.	sq. in.	%	lb
1 1/2	2.90	1.900	0.145	1.610	0.7995	55,000	43,970	1.8420	0.116	0.6290	78.68	34,595	1.8130	0.101	0.5457	68.26	30,016
						75,000	59,959					47,175					40,931
						80,000	63,957					50,320					43,660
						105,000	83,943					66,045					57,304
1 1/2	4.19	1.900	0.219	1.462	1.1565	55,000	63,610	1.8124	0.175	0.9011	77.92	49,562	1.7686	0.153	0.7779	67.26	42,787
						75,000	86,741					67,584					58,345
						80,000	92,523					72,090					62,235
						105,000	121,437					94,618					81,684
2 1/16	3.25	2.063	0.156	1.751	0.9346	55,000	51,403	2.0006	0.125	0.7354	78.69	40,450	1.9694	0.109	0.6382	68.28	35,099
						75,000	70,095					55,158					47,862
						80,000	74,768					58,836					51,053
						105,000	98,133					77,222					67,007
2 3/8	4.70	2.375	0.190	1.995	1.3042	55,000	71,733	2.2990	0.152	1.0252	78.61	56,388	2.2610	0.133	0.8891	68.17	48,903
						75,000	97,817					76,893					66,686
						80,000	104,339					82,019					71,132
						105,000	136,944					107,650					93,360
2 3/8	5.30	2.375	0.218	1.939	1.4773	55,000	81,249	2.2878	0.174	1.1579	78.38	63,686	2.2442	0.153	1.0027	67.88	55,150
						75,000	110,794					86,844					75,205
						80,000	118,181					92,634					80,218
						105,000	155,112					121,581					105,286
2 7/8	5.95	2.375	0.254	1.867	1.6925	55,000	93,087	2.2734	0.203	1.3216	78.08	72,686	2.2226	0.178	1.1422	67.49	62,820
						75,000	126,936					99,117					85,663
						80,000	135,399					105,725					91,374
						105,000	177,711					138,764					119,928
2 7/8	6.50	2.875	0.217	2.441	1.8120	55,000	99,661	2.7882	0.174	1.4260	78.69	76,427	2.7448	0.152	1.2374	68.29	88,054
						75,000	135,902					106,946					92,801
						80,000	144,962					114,076					98,988
						105,000	190,263					149,725					129,922

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Hook-Load at Minimum Yield Strength For New, Premium Class (Used), And Class 2 (Used) Tubing Work Strings… (continued)

NEW								PREMIUM CLASS					CLASS 2				
Size O.D.	W.T.	Orig. O.D.	Wall Thk.	I.D.	Orig. Cross-Section Area	Yield	Hook Lead	O.D. With 20% Wall Reduction	Min Remaining Wall (80%)	Reduced Cross-Section Area	Cross-Section Area Ratio	Hook Lead	O.D. With 30% Wall Reduction	Minimum Remaining Wall (70%)	Reduced Cross-Section Area	Cross-Section Area Ratio	Hook Lead
i.n.	lb/ft	i.n.	i.n.	i.n.	sq. in.	psi	lb	i.n.	i.n.	sq. in.	%	lb	i.n.	i.n.	sq. in.	%	lb
2 7/8	8.70	2.875	0.308	2.259	2.4839	55,000	136,612	2.7518	0.246	1.9394	78.08	106,667	2.6902	0.216	1.6761	67.48	921,186
						75,000	186,289					145,455					125,709
						80,000	198,708					155,152					134,089
						105,000	260,805					203,637					175,992
2 7/8	9.50	2.875	0.340	2.195	2.7077	55,000	148,926	2.7390	0.272	2.1081	77.85	115,945	2.6710	0.238	1.8192	67.18	100,053
						75,000	203,080					158,106					136,436
						80,000	216,619					168,647					145,532
						105,000	#######					221,349					191,011
2 7/8	10.70	2.875	0.392	2.091	3.0578	55,000	168,180	2.7182	0.314	2.3690	77.47	130,296	2.6398	0.274	2.0391	66.68	112,151
						75,000	229,337					177,676					152,933
						80,000	244,626					189,522					163,128
						105,000	321,072					248,747					214,106
2 7/8	11.00	2.875	0.405	2.065	3.1427	55,000	172,848	2.7130	0.324	2.4317	77.38	133,744	2.6320	0.283	2.0917	66.56	115,042
						75,000	235,702					182,378					156,875
						80,000	251,415					194,536					167,334
						105,000	329,983					255,329					219,626
3 1/2	12.80	3.500	0.368	2.764	3.6209	55,000	199,151	3.3528	0.294	2.8287	78.12	155,577	3.2792	0.258	2.4453	67.53	134,492
						75,000	271,569					212,150					183,398
						80,000	289,674					226,293					195,624
						105,000	380,197					297,010					256,757
3 1/2	12.95	3.500	0.375	2.750	3.6816	55,000	202,485	3.3500	0.300	2.8746	78.08	158,101	3.2750	0.263	2.4843	67.48	136,637
						75,000	276,117					215,592					186,323
						80,000	294,524					229,965					198,745
						105,000	386,563					301,828					260,853
3 1/2	15.80	3.500	0.476	2.548	4.5221	55,000	248,715	3.3096	0.381	3.5038	77.48	192,708	3.2144	0.333	3.0160	66.69	165,879
						75,000	339,156					262,783					226,198
						80,000	361,767					280,302					241,278
						105,000	474,819					367,897					316,678

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Hook-Load at Minimum Yield Strength For New, Premium Class (Used), And Class 2 (Used) Tubing Work Strings... (continued)

NEW								PREMIUM CLASS					CLASS 2				
Size O.D.	W.T.	Orig. O.D.	Wall Thk.	I.D.	Orig. Cross-Section Area	Yield	Hook Lead	O.D. With 20% Wall Reduction	Min Remaining Wall (80%)	Reduced Cross-Section Area	Cross-Section Area Ratio	Hook Lead	O.D. With 30% Wall Reduction	Minimum Remaining Wall (70%)	Reduced Cross-Section Area	Cross-Section Area Ratio	Hook Lead
i.n.	lb/ft	i.n.	i.n.	i.n.	sq. in.	psi	lb	i.n.	i.n.	sq. in.	%	lb	i.n.	i.n.	sq. in.	%	lb
3 1/2	16.70	3.500	0.510	2.480	4.7906	55,000	263,484	3.2960	0.408	3.7018	77.27	203,596	3.1940	0.357	3.1818	66.42	175,001
						75,000	359,296					277,631					238,638
						80,000	383,249					296,140					254,547
						105,000	503,015					388,684					334,093
4 1/2	15.50	4.500	0.337	3.826	4.4074	55,000	242,409	4.3652	0.270	3.4689	78.70	190,788	4.2978	0.236	3.0103	68.30	165,565
						75,000	330,558					260,165					225,771
						80,000	352,595					277,509					240,823
						105,000	462,781					364,231					316,080
4 1/2	19.20	4.500	0.430	3.640	5.4981	55,000	302,396	4.3280	0.344	4.3055	78.31	236,805	4.2420	0.301	3.7267	67.78	204,968
						75,000	412,358					322,916					279,502
						80,000	439,848					344,443					298,135
						105,000	577,301					452,082					391,302

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DIMENSIONAL DATA ON SELECTED HEAVY WEIGHT AND NON-API TUBING

OD (in.) **(mm)**	Weight (lb/ft) Plain End	Weight (lb/ft) Nom.	Tubular Wall (in.) **(mm)**	Tubular ID (in.) **(mm)**	Tubular Drift (in.) **(mm)**	Type of Joint	Joint ID* (in.)	Joint ID* **(mm)**	Joint Regular OD (in.)	Joint Regular OD **(mm)**	Joint Special OD (in.)	Joint Special OD **(mm)**	Inter-changeable With **
1.050 **26.7**	1.13	1.20	.113 **2.87**	.824 **20.93**	.730 **18.54**	GST Streamline			1.310	**33.27**			
						Hydril CS	.687	**17.45**	1.327	**33.71**	1.300	**33.02**	
						VAM	.807	**20.49**	1.299	**32.99**			
	1.47	1.50	.154 **3.91**	.742 **18.85**	.648 **16.46**	Hydril CS	.687	**17.45**	1.327	**33.71**			
						VAM	.728	**18.49**	1.339	**34.01**			
1.315 **33.4**	1.68	1.80	.133 **3.38**	1.049 **26.64**	.955 **24.26**	Rucker Atlas Brad, DS-HT			1.551	**39.40**			***
						Rucker Atlas Bradford DSS-HT & IJ-3SS	.985	**25.02**	1.562	**39.67**			***
						Rucker Atlas Brad. IJ-3S	.985	**25.02**	1.551	**39.40**			***
						GST Streamline			1.550	**39.37**			
						Hydril CS	.970	**24.64**	1.552	**39.42**	1.525	**38.74**	
						VAM	1.004	**25.50**	1.555	**39.49**			
	2.17	2.25	.179 **4.55**	.957 **24.31**	.848 **21.54**	Rucker Atlas Brad. DSS-HT	.849	**21.56**	1.600	**40.64**			
						Hydril CS	.864	**21.95**	1.600	**40.64**			
						VAM	.906	**23.01**	1.614	**40.99**			
1.660 **42.2**	2.27	2.40	.140 **3.56**	1.380 **35.05**	1.286 **32.66**	Rucker Atlas Brad. DS-HT			1.889	**47.98**			***
						Rucker Atlas Bradford DSS-HT & IJ-3SS	1.301	**33.05**	1.893	**48.08**			***
			.140 **3.56**	1.380 **35.05**	1.286 **32.66**	Rucker Atlas Brad. IJ-3S	1.301	**33.05**	1.889	**47.98**			***
						GST Streamline			1.880	**47.75**			
						Hydril A-95	1.300	**33.02**	1.898	**48.21**	1.858	**47.19**	CS
						Hydril CS	1.300	**33.02**	1.883	**47.83**	1.858	**47.19**	A-95
						VAM	1.307	**33.19**	1.913	**48.59**			

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OD (in.) (mm)	Weight (lb/ft) Plain End	Weight (lb/ft) Nom.	Tubular Wall (in.) (mm)	Tubular ID (in.) (mm)	Tubular Drift (in.) (mm)	Type of Joint	Joint ID* (in.)	Joint ID* (mm)	Joint Regular OD (in.)	Joint Regular OD (mm)	Joint Special OD (in.)	Joint Special OD (mm)	Inter-changeable With **
1.660 **42.2**	2.99	3.02	.191 **4.85**	1.278 **32.46**	1.184 **30.07**	Hydril CS VAM	1.218 1.209	**30.94** **30.70**	1.927 1.976	**48.95** **50.19**			A-95
	3.09	3.24	.198 **5.03**	1.264 **32.11**	1.170 **29.72**	Hydril CS	1.200	**30.48**	1.927	**48.95**			A-95
1.900 **48.3**	2.75	2.90	.145 **3.68**	1.610 **40.89**	1.516 **38.51**	Rucker Atlas Brad. DS-HT Rucker Atlas Bradford DSS-HT & IJ-3SS Rucker Atlas Brad. IJ-3S GST Streamline Hydril A-95 Hydril CS Mannesmann Omega VAM	 1.531 1.531 1.530 1.530 1.594 1.535	 **38.89** **38.89** **38.86** **38.86** **40.49** **38.98**	2.125 2.123 2.125 2.110 2.134 2.113 2.039 2.142	**53.98** **53.92** **53.98** **53.59** **54.20** **53.67** **51.79** **54.40**	 2.094 2.094	 **53.19** **53.19**	*** *** *** CS A-95
	3.63	3.64	.200 **5.08**	1.500 **38.1**	1.406 **35.71**	Hydril CS VAM	1.440 1.429	**36.58** **36.29**	2.162 2.220	**54.91** **56.38**			A-95
	3.93	4.19	.219 **5.56**	1.462 **37.13**	1.368 **34.75**	Hydril CS	1.390	**35.31**	2.179	**55.35**			A-95
2.000 **50.8**	3.23	3.4	.165 **4.19**	1.670 **42.42**	1.576 **40.03**	National Buttress Pittsburgh 8 Acme			2.500 2.500	**63.50** **63.50**	2.300 2.300	**58.42** **58.42**	
2.063 **52.4**	3.18	3.4	.156 **3.96**	1.750 **44.45**	1.656 **42.06**	Rucker Atlas Brad. DS-HT Rucker Atlas Bradford DSS-HT & IJ-3SS Rucker Atlas Brad. IJ-3S GST Streamline	 1.685 1.685	 **42.80** **42.80**	2.320 2.340 2.320 2.310	**58.93** **59.44** **58.93** **58.67**			*** *** ***

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OD (in.) (mm)	Weight (lb/ft) Plain End	Weight (lb/ft) Nom.	Tubular Wall (in.) (mm)	Tubular ID (in.) (mm)	Tubular Drift (in.) (mm)	Type of Joint	Joint ID* (in.)	Joint ID* (mm)	Joint Regular OD (in.)	Joint Regular OD (mm)	Joint Special OD (in.)	Joint Special OD (mm)	Inter-changeable With **
2.063 52.4	3.18	3.25	.156 **3.96**	1.750 **44.45**	1.656 **42.06**	Hydril A-95 Hydril CS VAM	1.770 1.700 1.677	**43.18** **43.18** **42.59**	2.325 2.330 2.331	**59.06** **59.18** **59.20**	2.300 2.300	**58.42** **58.42**	CS A-95
	4.41	4.5	.225 **5.71**	1.613 **40.97**	1.519 **38.58**	Hydril CS	1.550	**39.37**	2.375	**60.33**			A-95
2.375 60.3	4.43	4.47	.190 **4.83**	1.995 **50.67**	1.901 **48.92**	Rucker Atlas Brad. DS-HT			2.700	**68.58**			***
		4.7	.190 **4.83**	1.995 **50.67**	1.901 **48.92**	Rucker Atlas Bradford DSS-HT & IJ-3SS Rucker Atlas Brad. IJ-3S Rucker Atlas Brad. IJ-4S Rucker Atlas Brad. TC-4S Rucker Atlas Bradford FL-3S & FL-4S Armco Nu-Lock & Seal Lock Extreme Line GST Streamline Hydril, A-95 & CS Hydril CFJ-P	 1.930 1.935 1.945 1.926 1.950 1.935 1.945 1.945	 **49.02** **49.15** **49.40** **48.92** **49.53** **49.15** **49.40** **49.40**	 2.710 2.700 2.750 2.875 2.375 2.875 3.000 2.700 2.700 2.525	 **68.83** **68.58** **69.85** **73.03** **60.32** **73.03** **76.20** **68.58** **68.58** **64.14**	 2.750 2.700 2.630	 **69.85** **68.58** **66.80**	 *** *** TC-4S IJ-4S
		4.6				Hydril Super FJ Mannesmann Omega Mannesmann TDS Buttress & 8 Acme VAM	1.945 1.988 1.929	**49.40** **50.49** **49.00**	2.437 2.551 2.875 2.875 2.697	**61.90** **64.80** **73.03** **73.03** **68.50**	 2.700 2.618	 **68.58** **66.49**	4.6 lb FJ
	5.01	5.3	.218 **5.54**	1.939 **49.22**	1.845 **46.84**	Rucker Atlas Bradford DSS-HT & IJ 3SS Rucker Atlas Brad. IJ-4S Rucker Atlas Brad. TC-4S Hydril CS Hydril CFJ-P	 1.875 1.840 1.890 1.890	 **47.63** **48.01** **48.01** **48.01**	 2.710 2.750 2.875 2.740 2.525	 **68.83** **69.85** **73.03** **69.60** **64.14**	 2.750 	 69.85 	 *** TC-4S IJ-4S A-95

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OD (in.) (mm)	Weight (lb/ft) Plain End	Weight (lb/ft) Nom.	Tubular Wall (in.) (mm)	Tubular ID (in.) (mm)	Tubular Drift (in.) (mm)	Type of Joint	Joint ID* (in.)	Joint ID* (mm)	Joint Regular OD (in.)	Joint Regular OD (mm)	Joint Special OD (in.)	Joint Special OD (mm)	Inter-changeable With **
2.375 **60.3**	5.75	5.1	.254 **6.45**	1.867 **47.42**	1.773 **45.04**	VAM	1.929	**49.00**	2.697	**68.50**	2.618	**66.50**	*** TC-4S IJ-4S
		5.95				Rucker Atlas Bradford DSS-HT & IJ-3SS Rucker Atlas Brad. IJ-4S Rucker Atlas Brad. TC-4S Rucker Atlas Bradford FL-3S & FL-4S	1.805 1.820 1.823	**45.85** **46.23** **46.30**	2.910 2.800 2.875 2.375	**73.91** **71.12** **73.03** **60.33**	2.800	**71.12**	
		5.8				Armco Seal Lock	1.450	**49.53**	2.875	**73.03**			
		5.95				Extreme Line Hydril PH-6	1.807 1.805	**45.90** **45.85**	3.000 2.906	**76.20** **73.81**			
		5.8				Mannesmann Omega Mannesmann TDS VAM	1.867 1.867 1.867	**47.42** **47.42** **47.42**	2.614 2.875 2.776	**66.40** **73.03** **70.51**	2.697	**68.50**	
	5.89	6.2	.261 **6.63**	1.853 **47.07**	1.759 **44.68**	Rucker Atlas Bradford DSS-HT & IJ-3SS Rucker Atlas Brad. IJ-4S Rucker Atlas Brad. TC-4S Hydril PH-6	1.791 1.806 1.795	**45.49** **45.87** **45.59**	2.910 2.800 2.875 2.937	**73.91** **71.12** **73.03** **74.60**	2.800	**71.12**	*** TC-4S IJ-4S
	6.26	6.65	.280 **7.12**	1.815 **46.06**	1.721 **43.71**	Rucker Atlas Bradford FL-3S 8 FL-4S	1.771	**44.98**					
		6.3				VAM	1.866	**47.40**	2.856	**72.54**			
	7.3	7.7	.336 **8.53**	1.703 **43.24**	1.609 **40.68**	Rucker Atlas Bradford DSS-HT & IJ-3SS Rucker Atlas Brad. IJ-4S Rucker Atlas Brad. TC-4S Hydril Ph-6	1.641 1.656 1.645	**41.68** **42.06** **41.78**	3.135 2.900 3.000 3.125	**79.63** **73.66** **76.20** **79.38**	2.400	**73.66**	*** TC-4S IJ-4S
		7.3				VAM	1.866	**47.40**	2.856	**72.54**			

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OD (in.) (mm)	Weight (lb/ft) Plain End	Weight (lb/ft) Nom.	Tubular Wall (in.) (mm)	Tubular ID (in.) (mm)	Tubular Drift (in.) (mm)	Type of Joint	Joint ID* (in.)	Joint ID* (mm)	Joint Regular OD (in.)	Joint Regular OD (mm)	Joint Special OD (in.)	Joint Special OD (mm)	Inter-changeable With **
2.875 **73.0**	6.16	6.5	.217 **5.51**	2.441 **62.00**	2.347 **59.61**	Rucker Atlas Brad. DS-HT			3.218	**81.74**			***
						Rucker Atlas Brad. DSS-HT & IJ-3SS	2.379	**60.43**	3.230	**82.04**			***
						Rucker Atlas Brad. IJ-3S	2.379	**60.43**	3.218	**81.74**			***
						Rucker Atlas Brad. IJ-4S	2.394	**60.81**	3.250	**82.55**			TC-4S IJ-4S
						Rucker Atlas Brad. TC-4S			3.500	**88.90**	3.250	**82.55**	
						Rucker Atlas Bradford FL-3S & FL-4S	2.372	**60.25**	2.875	**73.03**			
						Armco Nu-Lock	2.396	**60.86**	3.500	**88.90**	3.220	**81.79**	
		6.4				Armco Seal Lock	2.396	**60.86**	3.500	**88.90**	3.220	**81.79**	
		6.5				Extreme Line	2.381	**60.48**	3.500	**88.90**			
						GST Streamline			3.220	**81.79**			
						Hydril A-95			3.220	**81.79**	3.155	**88.14**	CS
						Hydril CS	2.375	**60.33**	3.220	**81.79**	3.155	**80.14**	A-95
						Hydril CFJ-P	2.375	**60.33**	3.000	**76.20**			
		6.4				Hydril Super FJ	2.375	**60.33**	2.968	**75.39**			6.4 lb FJ
						Mannesmann Omega			3.079	**78.21**			
						Mannesmann TDS			3.500	**88.90**			
						National Buttress			3.500	**88.90**	3.220	**81.79**	
						Pittsburgh 8 Acme			3.500	**88.90**	3.220	**81.79**	
						VAM	2.375	**60.33**	3.197	**81.20**	3.150	**80.01**	
	6.48	7.9	.276 **7.01**	2.323 **59.00**	2.229 **56.61**	Rucker Atlas Bradford							
						DSS-HT & IJ-3SS	2.261	**57.43**	3.385	**85.98**			***
						Rucker Atlas Brad. IJ-4S	2.276	**57.81**	3.375	**85.73**			TC-4S
						Rucker Atlas Brad. TC-4S			3.500	**88.90**	3.375	**85.73**	IJ-4S
						Rucker Atlas Bradford FL-3S & FL-4S	2.279	**57.89**	2.875	**73.03**			
						Hydril PH-6	2.265	**57.53**	3.437	**87.30**			
		7.7				VAM	2.323	**59.00**	3.327	**84.51**	3.264	**82.91**	

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OD (in.) **(mm)**	Weight (lb/ft) Plain End	Weight (lb/ft) Nom.	Tubular Wall (in.) **(mm)**	Tubular ID (in.) **(mm)**	Tubular Drift (in.) **(mm)**	Type of Joint	Joint ID* (in.)	Joint ID* **(mm)**	Joint Regular OD (in.)	Joint Regular OD **(mm)**	Joint Special OD (in.)	Joint Special OD **(mm)**	Inter-changeable With **
2.875 **73.0**	8.44	8.7	.308 **7.82**	2.259 **57.36**	2.165 **55.00**	Rucker Atlas Bradford DSS-HT & IJ-4SS	2.197	**55.80**	3.510	**89.15**			*** TC-4S IJ-4S
						Rucker Atlas Brad. IJ-4S	2.212	**56.18**	3.375	**85.73**			
						Rucker Atlas Brad. TC-4S			3.500	**88.90**	3.375	**85.73**	
						Rucker Atlas Bradford FL-3S & FL-4S	2.215	**56.26**	2.875	**73.03**			
		8.6				Armco Seal Lock	2.396	**60.86**	3.500	**88.90**			
		8.7				Extreme Line	2.199	**55.85**	3.625	**92.08**			
						Hydril PH-6	2.200	**55.88**	3.500	**88.90**			
		8.6				Mannesmann Omega			3.154	**80.11**			
						Mannesmann TDS			3.500	**88.90**			
						VAM	2.260	**57.40**	3.327	**84.51**	3.264	**82.91**	
	9.78	9.5	.340 **8.64**	2.195 **55.75**	2.101 **53.37**	Rucker Atlas Bradford DSS-HT & IJ-3SS	2.133	**54.18**	3.635	**92.33**			*** TC-4S IJ-4S
						Rucker Atlas Brad. IJ-4S	2.148	**54.56**	3.450	**87.63**			
						Rucker Atlas Brad. TC-4S			3.500	**88.90**	3.450	**87.63**	
						Hydril PH-6	2.130	**54.10**	3.625	**92.08**			
	9.69	10.4	.362 **9.19**	2.151 **54.64**	2.057 **52.26**	Rucker Atlas Bradford FL-3S & FL-4S	2.107	**53.52**	2.875	**73.03**			
		9.7				VAM	2.260	**57.40**	3.453	**87.71**			
	10.39	10.7	.392 **9.96**	2.091 **53.11**	1.997 **50.72**	Hydril PH-6	2.030	**51.56**	3.687	**93.65**			
	10.66	11.0	.405 **10.28**	2.065 **52.46**	1.972 **50.08**	Rucker Atlas Bradford DSS-HT & IJ-SS	2.003	**50.88**	3.760	**95.50**			*** TC-4S IJ-4S
						Rucker Atlas Brad. IJ-4S	2.018	**51.26**	3.500	**88.90**			
						Rucker Atlas Brad. TC-4S			3.625	**92.08**	3.500	**88.90**	
						Hydril PH-4	2.000	**50.80**	3.750	**95.25**			
						Hudril PH-6	2.000	**50.80**	3.750	**95.25**			

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2.875 **73**	10.66	10.7	.405 **10.28**	2.065 **52.46**	1.972 **50.08**	VAM	2.205	**56.0**	3.453	**87.71**			
2.875 **73**	11.44	11.65	.440 **11.18**	1.995 **50.67**	1.901 **48.29**	Rucker Atlas Bradford DSS-HT & IJ-3SS Rucker Atlas Brad. IJ-4S Rucker Atlas Brad. TC-4S Hydril PH-4	 1.933 1.948 1.945	 **49.10** **49.48** **49.40**	 3.760 3.550 3.625 3.750	 **95.50** **90.17** **92.08** **95.25**	 3.550	 **90.17**	 *** TC-4S IJ-4S
3.500 **88.9**	7.57	7.7	.216 **5.49**	3.068 **77.93**	2.943 **74.75**	Rucker Atlas Bradford FL-3S & FL-4S Mannesmann Omega VAM	 2.968 3.067 2.972	 **75.39** **77.90** **75.49**	 3.500 3.701 3.803	 **88.90** **94.01** **96.60**			
	8.81	9.3	.254 **6.45**	2.992 **76.00**	2.867 **72.82**	Rucker Atlas Brad. DS-HT Rucker Atlas Bradford DSS-HT & IJ-3SS Rucker Atlas Brad. IJ-3S Rucker Atlas Brad. IJ-4S Rucker Atlas Brad. TC-4S Rucker Atlas Bradford FL-3S & FL-4S Armco Nu-Lock	 2.417 2.417 2.932 2.917 2.947	 **74.09** **74.09** **74.47** **74.09** **74.85**	3.875 3.875 3.875 3.950 4.250 3.500 4.250	**98.43** **98.43** **98.43** **100.33** **107.95** **88.90** **107.95**	 3.950 3.865	 **100.33** **98.17**	*** *** *** TC-4S IJ-4S
		9.2				Armco Seal Lock	2.927	**74.35**	4.250	**107.95**	3.865	**98.17**	
		9.3				Extreme Line GST Streamline Hydril A-95 & CS Hydril CFJ-P	2.907 2.920 2.920	**73.84** **74.17** **74.17**	4.250 3.865 3.905 3.609	**107.95** **98.17** **99.19** **91.67**	 3.805	 **96.65**	
		9.2				Hydril Super FJ Mannesmann Omega Mannesmann TDS National Buttress Pittsburgh 8 Acme VAM	2.930 2.992 2.992 2.972	**74.42** **76.00** **76.00** **75.49**	3.594 4.250 4.250 4.250 3.862	**91.29** **107.95** **107.95** **107.95** **48.09**	 3.865 3.865 3.793	 **98.17** **98.17** **96.34**	9.2 lb FJ

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3.500 **88.9**	9.91	10.3	.289 **7.34**	2.922 **74.22**	2.797 **71.04**	Rucker Atlas Bradford DSS-HT &IJ-3SS	2.847	**72.31**	3.947	**100.25**			***
						Rucker Atlas Brad. IJ-4S	2.862	**72.69**	3.950	**100.33**			TC-4S
						Rucker Atlas Brad. TC-4S			4.250	**107.95**	3.950	**100.33**	IJ-4S
						Rucker Atlas Bradford FL-3S & FL-4S	2.847	**72.31**	3.500	**88.90**			
						Hydril CS	2.878	**73.10**	3.955	**100.46**			A-95
						Hydril CFJ-P	2.878	**73.10**	3.609	**91.67**			
		10.2				Hydril Super FJ	2.860	**74.19**	3.594	**91.29**			10.2 lb FJ
						Mannesmann Omega	2.921	**72.64**					
						Mannesmann TDS	2.921	**74.19**	4.250	**107.95**			
						VAM	2.925	**74.30**	3.917	**99.49**	3.852	**97.84**	
	12.31	12.7	.368 **9.35**	2.764 **70.21**	2.639 **67.03**	Rucker Atlas Bradford FL-3S & FL-4S	2.689	**68.30**	3.500	**88.90**			
		12.8				Hydril Super FJ	2.700	**68.58**	3.594	**91.29**			
						Hydril PH-6	2.700	**68.58**	4.312	**109.52**			15.5 FJ/SFJ
	12.52	12.95	.375 **9.52**	2.750 **69.86**	2.625 **66.68**	Rucker Atlas Bradford DSS-HT & IJ-3SS	2.675	**67.95**	4.260	**108.20**			***
						Rucker Atlas Brad. IJ-4S	2.690	**68.33**	4.100	**104.14**			TC-4S
						Rucker Atlas Brad. TC-4S			4.250	**107.95**	4.100	**104.14**	IJ-4S
						Rucker Atlas Bradford FL-3S & Fl-4S	2.675	**67.95**	3.500	**88.90**			
		12.7				Armco Seal Lock	2.927	**74.35**	4.250	**107.95**			
		12.95				Extreme Line Hydril Ph-6	2.687	**68.25**	4.312	**109.52**			
		12.7				Mannesmann Omega	2.752	**69.90**					
						Mannesmann TDS	2.752	**69.90**	4.250	**107.95**			
						VAM	2.925	**74.30**	4.035	**102.49**	3.957	**100.51**	

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3.500 88.9	13.6	13.7	.413 **10.49**	2.673 **67.89**	2.548 **64.72**	VAM	2.835	**72.01**	4.138	**105.11**	4.026	**102.26**	
	14.62	15.5	.449 **11.40**	2.602 **66.09**	2.477 **62.92**	Rucker Atlas Bradford FL-3S & FL-4S	2.527	**64.19**	3.500	**88.90**			
						Hydril Super FJ	2.540	**64.52**	3.594	**91.29**			2.8 FJ/SFJ
		14.7				VAM	2.756	**70.00**	4.138	**105.11**	4.026	**102.26**	
	15.37	15.8	.476 **12.09**	2.548 **64.72**	2.423 **61.54**	Rucker Atlas Brad. DSS-HT	2.470	**62.74**	4.385	**111.38**			***
						Rucker Atlas Bradford IJ-4S	2.488	**63.20**	4.200	**106.68**			TC-4S
						Rucker Atlas Brad. TC-4S			4.375	**111.13**	4.200	**106.68**	IJ-4S
						Hydril PH-6	2.485	**63.12**	4.500	**114.30**			
	15.68	15.8	.488 **12.40**	2.524 **64.10**	2.399 **60.92**	VAM	2.756	**70.00**	4.252	**108.00**	4.128	**104.85**	
	16.28	16.7	.510 **12.95**	2.480 **62.99**	2.355 **59.82**	Rucker Atlas Brad. DSS-HT	2.391	**60.73**	4.525	**114.94**			***
						Rucker Atlas Brad. IJ-4S	2.420	**61.47**	4.250	**107.95**			TC-4S
						Rucker Atlas Brad. TC-4S			4.375	**111.13**	4.250	**107.95**	IJ-4S
						Hydril PH-4	2.406	**61.11**	4.562	**115.87**			
						Hydril PH-6	2.406	**61.11**	4.562	**115.87**			
	16.81	17.05	.530 **13.46**	2.440 **61.98**	2.315 **58.80**	Extreme Line	2.398	**60.91**	4.374	**111.10**			
						Hydril PH-4	2.375	**60.33**	4.562	**115.87**			
4.000 101.6	9.11	9.5	.226 **5.74**	3.548 **90.12**	3.423 **86.45**	Rucker Atlas Bradford FL-3S & FL-4S	3.448	**87.58**	4.000	**101.60**			
						Mannesmann Omega	3.547	**90.09**	4.209	**106.91**			
						VAM	3.480	**88.39**	4.325	**109.86**			
	10.46	11.0	.262 **6.65**	3.476 **88.29**	3.351 **85.12**	Rucker Atlas Brad. DS-HT			4.412	**112.06**			***
						Rucker Atlas Bradford DSS-HT & IJ-3SS	3.401	**86.39**	4.385	**111.38**			***

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OD (in.) (mm)	Weight (lb/ft) Plain End	Weight (lb/ft) Nom.	Tubular Wall (in.) (mm)	Tubular ID (in.) (mm)	Tubular Drift (in.) (mm)	Type of Joint	Joint ID* (in.)	Joint ID* (mm)	Joint Regular OD (in.)	Joint Regular OD (mm)	Joint Special OD (in.)	Joint Special OD (mm)	Inter-changeable With **
4.000 **101.6**	10.46	11.0	.262 **6.65**	3.476 **88.29**	3.351 **85.12**	Rucker Atlas Brad. IJ-3S	3.401	**86.39**	4.412	**112.06**			***
						Rucker Atlas Brad. IJ-4S	3.416	**86.77**	4.450	**113.03**			TC-4S
						Rucker Atlas Brad. TC-4S			4.500	**114.30**	4.450	**113.03**	IJ-4S
						Rucker Atlas Bradford FL-3S & FL-4S	3.401	**86.39**	4.000	**101.60**			
						Hydril A-95 & CS	3.395	**86.23**	4.405	**111.89**	4.315	**109.60**	
						Hydri CFJ-P	3.395	**86.23**	4.100	**104.14**			.
						Hydril Super FJ	3.395	**86.23**	4.094	**103.99**			11.6 FJ/SFJ
						Mannesmann Omega	3.476	**88.29**	4.236	**107.59**			
						Mannesmann TDS	3.476	**88.29**	4.748	**120.60**			
		10.9				Pittsburgh 8 Acme			4.750	**120.65**	4.400	**111.76**	
						National Buttress			4.750	**120.65**	4.400	**111.76**	
						VAM	3.457	**87.81**	4.366	**110.90**	4.315	**109.60**	
	11.34	11.6	.286 **7.26**	3.428 **87.07**	3.303 **83.90**	Rucker Atlas Bradford FL-3S & FL-4S	3.353	**85.17**	4.000	**101.60**			11 FJ/SFJ
						Hydril Super FJ	3.350	**85.09**	4.094	**103.99**			
	12.93	13.4	.330 **8.38**	3.340 **84.84**	3.215 **81.67**	Rucker Atlas Bradford DSS-HT & IJ-3SS	3.265	**82.93**	4.572	**116.13**			***
						Rucker Atlas Brad. IJ-4S	3.280	**83.31**	4.525	**114.94**			TC-4S
						Rucker Atlas Brad. TC-4S			4.625	**117.48**	4.525	**114.94**	IJ-4S
		14.0				Rucker Atlas Bradford FL-3S & FL-4S	3.265	**82.93**	4.000	**101.60**			
		13.4				Hydril Super FJ	3.260	**82.80**	4.094	**103.99**			13.4 lb FJ
						Hydril PH-6	3.275	**83.19**	4.625	**117.48**			
		13.0				VAM	3.457	**87.81**	4.468	**113.49**	4.356	**110.64**	

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OD (in.) (mm)	Weight (lb/ft)		Tubular			Type of Joint	Joint						
							ID*		Regular OD		Special OD		Inter-changeable With **
	Plain End	Nom.	Wall (in.) (mm)	ID (in.) (mm)	Drift (in.) (mm)		(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	
4.000 101.6	14.66	14.8	.380 9.65	3.240 82.3	3.115 79.13	VAM	3.346	84.99	4.614	117.20			
	16.36	16.5	.430 10.92	3.140 79.76	3.015 76.59	VAM	3.346	84.99	4.614	117.20			
	18.69	19.0	.500 12.70	3.000 76.20	2.875 73.03	Hydril PH-4	2.920	74.17	5.000	127.00			
	22.08	22.8	.610 15.49	2.780 70.61	2.655 67.44	Rucker Atlas Brad. DSS-HT Rucker Atlas Brad. IJ-4S Rucker Atlas Brad. TC-4S	2.705 2.720	68.71 69.09	4.885 4.850 5.000	124.08 123.19 127.00	4.850	123.19	*** TC-4S IJ-4S
		22.5				Hydril PH-4	2.700	68.58	5.187	131.75			
4.500 114.3	9.4	9.5	.205 5.21	4.090 103.89	3.965 100.71	Rucker Atlas Bradford FL-3S & FL-4S	3.990	101.35	4.500	114.30			
	10.23	10.5	.224 5.69	4.052 102.92	3.927 99.75	Rucker Atlas Bradford FL-3S & FL-4S	3.952	100.38	4.500	114.30			
	11.35	11.6	.250 6.35	4.000 101.60	3.875 98.43	Rucker Atlas Bradford FL-3S & FL-4S	3.925	99.70	4.500	114.30			
	12.24	12.75	.271 6.88	3.958 100.53	3.833 97.36	Rucker Atlas Brad. DS-HT Rucker Atlas Bradford DSS-HT & IJ-3SS Rucker Atlas Brad. IJ-4S Rucker Atlas Brad. TC-4S	3.883 3.898	98.63 99.01	4.880 4.940 4.960 5.000	123.95 125.48 125.48 127.00	4.960	125.98	*** *** TC-4S IJ-4S
		12.6				Rucker Atlas Bradford FL-3S & FL-4S	3.883	98.63	4.500	114.30			
		12.75				Hydril A-95 & CS Hydril CFJ-P	3.865 3.865	98.17 98.17	4.910 4.609	124.71 117.07	4.825	122.56	

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OD (in.) (mm)	Weight (lb/ft) Plain End	Weight (lb/ft) Nom.	Tubular Wall (in.) (mm)	Tubular ID (in.) (mm)	Tubular Drift (in.) (mm)	Type of Joint	Joint ID* (in.)	Joint ID* (mm)	Joint Regular OD (in.)	Joint Regular OD (mm)	Joint Special OD (in.)	Joint Special OD (mm)	Inter-changeable With **
4.500 **114.3**	12.24	12.6	.271 **6.88**	3.958 **100.53**	3.833 **97.36**	Hydril Super FJ	3.880	**98.55**	4.594	**116.69**			13.5 FJ/SFJ
						Mannesmann Omega	3.957	**100.51**	4.744	**120.50**			
						Mannesmann TDS	3.957	**100.51**	5.201	**132.11**			
						National Buttress			5.200	**132.08**	4.920	**124.97**	
						Pittsburgh 8 Acme			5.200	**132.08**	4.920	**124.97**	
						VAM	3.933	**99.90**	4.862	**123.49**			
	13.04	13.5	2.90 **7.37**	3.920 **99.57**	3.795 **96.39**	Rucker Atlas Brad. DSS-HT	3.845	**97.66**	4.940	**125.48**			***
						Rucker Atlas Brad. IJ-4S	3.860	**98.04**	4.960	**125.98**			TC-4S
						Rucker Atlas Brad. TC-4S			5.000	**127.00**	4.960	**125.98**	IJ-4S
						Rucker Atlas Bradford							
						FL-3S & FL-4S	3.845	**97.66**	4.500	**114.30**			
						Hydril CS	3.840	**97.54**	4.935	**125.35**			A-95
						Hydril Super FJ	3.840	**97.54**	4.594	**116.69**			
						Mannesmann TDS	3.921	**99.59**	5.201	**132.11**			12.6 FJ/SFJ
	14.98	15.5	.337 **8.56**	3.826 **97.18**	3.701 **94.01**	Rucker Atlas Bradford DSS-HT & IJ-3SS	3.751	**95.28**	5.060	**128.52**	5.200	**132.08**	***
						Rucker Atlas Bradford IJ-4S	3.766	**95.66**	5.200	**132.08**			TC-4S
						Rucker Atlas Brad. TC-4S			5.250	**133.35**			IJ-4S
		15.1				Rucker Atlas Bradford FL-3S & FI-4S	3.751	**95.28**	4.500	**114.30**			
		15.5				Hydril PH-6	3.765	**95.63**	5.125	**130.18**			
		15.1				Mannesmann TDS	3.827	**97.21**	5.201	**132.11**			
	16.44	16.9	3.73 **9.47**	3.754 **95.35**	3.679 **92.18**	Rucker Atlas Brad. DSS-HT	3.679	**93.45**	5.150	**130.81**			***
						Rucker Atlas Brad. IJ-4S	3.680	**93.47**	5.200	**132.08**			TC-4S
						Rucker Atlas Brad. TC-4S			5.250	**133.35**	5.200	**132.08**	IJ-4S

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OD (in.) **(mm)**	Weight (lb/ft)		Tubular			Type of Joint	Joint						Inter-changeable With **
							ID*		Regular OD		Special OD		
	Plain End	Nom.	Wall (in.) **(mm)**	ID (in.) **(mm)**	Drift (in.) **(mm)**		(in.)	**(mm)**	(in.)	**(mm)**	(in.)	**(mm)**	
4.500 **114.3**	16.44	16.9	3.73 **9.47**	3.754 **95.35**	3.679 **92.18**	Rucker Atlas Bradford FL-3S & FL-4S	3.679	**93.45**	4.500	**114.30**			
	18.69	19.2	.430 **10.92**	3.640 **92.46**	3.515 **89.28**	Rucker Atlas Bradford DSS-HT & IJ-3SS	3.565	**90.55**	5.260	**113.6**			***
						Rucker Atlas Brad. IJ-4S	3.580	**90.93**	5.200	**132.08**			TC-4S
						Rucker Atlas Brad. TC-4S			5.250	**133.35**	5.200	**132.08**	IJ-4S
						Rucker Atlas Bradford FL-3S & FJ-4S	3.565	**90.55**	4.500	**114.30**			
						Hydril PH-6	3.560	**90.42**	5.312	**134.92**			
	21.36	21.6	.500 **12.70**	3.500 **88.90**	3.375 **85.73**	Rucker Atlas Brad. DSS-HT	3.425	**86.99**	5.375	**136.53**			***
						Rucker Atlas Brad. IJ-4S	3.425	**86.99**	5.375	**136.53**			TC-4S
						Rucker Atlas Brad. TC-4S			5.375	**136.53**	5.300	**134.62**	IJ-4S
						Rucker Atlas Bradford FL-3S & FL-4S	3.425	**86.99**	4.500	**114.30**			
						Hydril PH-4	3.420	**86.87**	5.500	**139.70**			
	23.56	24.6	.560 **14.22**	3.380 **85.85**	3.255 **82.68**	Hydril PH-4	3.300	**83.82**	5.562	**141.27**			
	26.04	26.5	.630 **16.00**	3.240 **82.29**	3.115 **79.12**	Hydril PH-4	3.160	**80.26**	5.687	**144.45**			

* Joint ID listed only when bored, otherwise same as tubular I.D.

** IJ and T&C joints listed are mechanically interchangeable through entire weight range in each size. Flush joints are not interchangeable from one weight to another in same size except as indicated for some special Hydril weights.

*** DS-HT, DSS-HT, IJ-3S and IJ-3SS joints are mechanically interchangeable although mixed connections can render the metal-to-metal pin nose seal of the IJ-3S and IJ-3SS joints ineffective.

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PERFORMANCE DATA FOR SELECTED HEAVY WEIGHT AND NON-API TUBULARS*

OD (in.) **(mm)**	Wall Thickness (in.) **(mm)**	Weight (lb/ft) **(kg/m)**		Grade	Collapse Pressure (psi) **(kPa)**	Internal Yield Pressure (psi) **(kPa)**	Tensile Strength (lb) **(daN)**
		Plain End	Nominal – Dependent on Type of Joint				
1.050 **26.7**	.154 **3.91**		1.5 **2.23**	J-55	13,770 **94,900**	14,120 **97,400**	24,000 **10,670**
				C-75	18,700 **129,400**	19,250 **132,700**	33,000 **14,680**
				N-80	20,020 **138,000**	20,530 **141,600**	35,000 **15,570**
				P-105	26,280 **181,200**	26,950 **185,800**	46,000 **20,460**
1.315 **33.4**	.179 **4.55**		2.25 **3.35**	J-55	12,940 **89,200**	13,100 **90,300**	35,000 **15,570**
				C-75	17,640 **121,600**	17,870 **123,200**	48,000 **21,350**
				N-80	18,820 **130,000**	19,060 **131,400**	51,000 **22,680**
				P-105	24,700 **170,300**	25,010 **172,400**	67,000 **29,800**
1.660 **42.2**	.191 **4.85**		3.02 **4.49**	J-55	11,200 **77,200**	11,070 **76,300**	48,000 **21,350**
				C-75	15,270 **105,300**	15,100 **104,100**	66,000 **29,360**
				N-80	16,290 **112,300**	16,100 **111,100**	71,000 **31,580**
				P-105	21,380 **147,400**	21,140 **145,800**	93,000 **41,370**

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OD (in.) **(mm)**	Wall Thickness (in.) **(mm)**	Weight (lb/ft) **(kg/m)**		Grade	Collapse Pressure (psi) **(kPa)**	Internal Yield Pressure (psi) **(kPa)**	Tensile Strength (lb) **(daN)**
		Plain End	Nominal – Dependent on Type of Joint				
1.660 **42.2**	.198 **5.03**		3.24 **4.82**	J-55	11,560 **79,700**	11,480 **79,200**	50,000 **22,240**
				C-75	15,760 **108,700**	15,660 **108,000**	68,000 **30,250**
				N-80	16,810 **115,900**	16,700 **115,100**	73,000 **32,470**
				P-105	22,060 **152,100**	21,920 **151,100**	95,000 **42,300**
1.900 **48.3**	.200 **5.08**		3.64 **5.42**	J-55	10,360 **71,400**	10,130 **69,800**	57,000 **25,350**
				C-75	14,130 **97,400**	13,820 **95,290**	80,000 **35,580**
				N-80	15,070 **103,900**	14,740 **101,600**	84,000 **37,360**
				P-105	19,780 **136,400**	19,340 **133,300**	110,000 **48,930**
1.900 **48.3**	.219 **5.56**		4.19 **6.23**	J-55	11,220 **77,400**	11,090 **76,500**	64,000 **28,470**
				C-75	15,300 **105,500**	15,130 **104,300**	87,000 **38,700**
				N-80	16,320 **112,500**	16,140 **111,300**	93,000 **41,370**
				P-105	21,420 **147,700**	21,180 **146,000**	121,000 **53,820**

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OD (in.) **(mm)**	Wall Thickness (in.) **(mm)**	Weight (lb/ft) **(kg/m)**		Grade	Collapse Pressure (psi) **(kPa)**	Internal Yield Pressure (psi) **(kPa)**	Tensile Strength (lb) **(daN)**
		Plain End	Nominal – Dependent on Type of Joint				
2.000 **50.8**	.165 **4.19**		3.4 **5.06**	J-55	8,320 **57,400**	7,940 **54,700**	52,320 **23,720**
				C-75	11,350 **78,300**	10,830 **74,700**	71,330 **31,730**
				N-80	12,110 **83,500**	11,550 **79,600**	76,080 **33,840**
				P-105	15,890 **109,600**	15,160 **104,500**	99,800 **44.420**
2.062 **52.4**	.225 **5.71**		4.5 **6.70**	J-55	10,690 **73,700**	10,500 **72,400**	71,000 **31,580**
				C-75	14,580 **100,500**	14,320 **98,700**	97,000 **43,150**
				N-80	15,550 **107,200**	15,270 **105,300**	104,000 **46,260**
				P-105	20,410 **140,700**	20,050 **138,200**	136,000 **60,490**
2.375 **60.3**	.218 **5.54**	5.01	5.1 - 5.3 **7.59 - 7.89**	J-55	9,170 **63,200**	8,840 **61,000**	81,000 **36,030**
				C-75	12,510 **86,300**	12,050 **83,100**	111,000 **49,370**
				N-80	13,340 **92,000**	12,860 **88,700**	118,000 **52,490**
				P-105	17,510 **120,700**	16,870 **116,300**	155,000 **68,940**

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OD (in.) **(mm)**	Wall Thickness (in.) **(mm)**	Weight (lb/ft) **(kg/m)**		Grade	Collapse Pressure (psi) **(kPa)**	Internal Yield Pressure (psi) **(kPa)**	Tensile Strength (lb) **(daN)**
		Plain End	Nominal – Dependent on Type of Joint				
2.375 **60.3**	.261 **6.63**		6.2 **9.23**	J-55	10,760 **74,200**	10,580 **73,000**	95,000 **42,260**
				C-75	14,670 **101,200**	14,420 **99,400**	130,000 **57,820**
				N-80	15,650 **107,900**	15,390 **106,100**	139,000 **61,830**
				P-105	20,540 **141,600**	20,200 **139,300**	182,000 **80,950**
	.280 **7.12**	6.26	6.3 - 6.5 **9.37 - 9.67**	J-55	11,440 **78,900**	11,350 **78,360**	101,000 **44,920**
				C-75	15,600 **107,600**	15,470 **106,700**	138,000 **61,380**
				N-80	16,640 **114,700**	16,500 **113,800**	147,000 **65,390**
				P-105	21,840 **150,600**	21,660 **149,400**	193,000 **85,850**
	.336 **8.53**	7.3	7.3 - 7.7 **10.86 - 11.46**	J-55	13,360 **92,100**	13,620 **93,900**	118,000 **52,490**
				C-75	18,220 **125,600**	18,570 **128,000**	161,000 **71,610**
				N-80	19,430 **134,000**	19,810 **136,600**	172,000 **76,510**
				P-105	25,510 **175,900**	26,010 **179,300**	226,000 **100,520**

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OD (in.) **(mm)**	Wall Thickness (in.) **(mm)**	Weight (lb/ft) **(kg/m)**		Grade	Collapse Pressure (psi) **(kPa)**	Internal Yield Pressure (psi) **(kPa)**	Tensile Strength (lb) **(daN)**
		Plain End	Nominal – Dependent on Type of Joint				
2.875 **73.0**	.276 **7.01**	6.48	7.7 - 7.9 **11.46 - 11.75**	J-55	9,550 **65,800**	9,250 **63,800**	124,000 **55,160**
				C-75	13,020 **89,800**	12,600 **86,900**	169,000 **75,170**
				N-80	13,890 **95,800**	13,450 **92,700**	180,000 **80,060**
				P-105	18,230 **125,700**	17,650 **121,700**	236,000 **104,980**
2.875 **73.0**	.340 **8.64**		9.5 **14.14**	J-55	11,470 **79,100**	11,390 **78,500**	149,000 **66,280**
				C-75	15,640 **107,800**	15,520 **107,000**	203,000 **90,300**
				N-80	16,690 **115,100**	16,560 **114,200**	217,000 **96,520**
				P-105	21,900 **151,000**	21,730 **149,800**	285,000 **126,770**
	.362 **9.19**		9.7 - 10.4 **14.43 - 15.48**	J-55	12,110 **83,500**	12,120 **83,600**	157,000 **69,830**
				C-75	16,510 **113,800**	16,530 **114,000**	214,000 **95,190**
				N-80	17,610 **121,400**	17,630 **121,600**	229,000 **101,860**
				P-105	23,100 **159,300**	23,140 **159,600**	300,000 **133,440**

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OD (in.) **(mm)**	Wall Thickness (in.) **(mm)**	Weight (lb/ft) **(kg/m)**		Grade	Collapse Pressure (psi) **(kPa)**	Internal Yield Pressure (psi) **(kPa)**	Tensile Strength (lb) **(daN)**
		Plain End	Nominal – Dependent on Type of Joint				
2.875 **73.0**	.392 **9.96**		10.7 **15.92**	J-55	12,960 **89,400**	13,120 **90,500**	168,000 **74,730**
				C-75	17,670 **121,800**	17,890 **123,400**	229,000 **101,860**
				N-80	18,850 **130,000**	19,090 **131,600**	245,000 **108,980**
				P-105	24,740 **170,600**	25,050 **172,700**	321,000 **142,780**
	.405 **10.28**		10.7 - 11.0 **15.92 - 16.37**	J-55	13,310 **91,800**	13,570 **93,600**	173,000 **76,950**
				C-75	18,150 **125,100**	18,490 **127,500**	236,000 **104,970**
				N-80	19,360 **133,500**	19,730 **136,000**	251,000 **111,640**
				P-105	25,410 **175,200**	25,890 **178,500**	329,000 **146,340**
	.440 **11.18**		11.65 **17.34**	J-55	14,260 **98,300**	14,730 **101,600**	185,000 **82,290**
				C-75	19,440 **134,000**	20,090 **138,500**	252,000 **112,090**
				N-80	20,740 **143,000**	21,430 **147,800**	269,000 **119,650**
				P-105	27,220 **187,700**	28,120 **193,900**	353,000 **157,010**

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OD (in.) **(mm)**	Wall Thickness (in.) **(mm)**	Weight (lb/ft) **(kg/m)**		Grade	Collapse Pressure (psi) **(kPa)**	Internal Yield Pressure (psi) **(kPa)**	Tensile Strength (lb) **(daN)**
		Plain End	Nominal – Dependent on Type of Joint				
3.500 **88.9**	.368 **9.35**	12.31	12.7 - 12.8 **18.90 - 19.05**	J-55	10,350 **71,400**	10,120 **69,800**	199,000 **88,520**
				C-75	14,110 **97,300**	13,800 **95,200**	272,000 **120,900**
				N-80	15,060 **103,800**	14,730 **101,600**	290,000 **128,900**
				P-105	19,760 **136,200**	19,320 **133,200**	380,000 **169,000**
	.413 **10.49**	13.6	13.7 **20.39**	J-55	11,520 **79,400**	11,440 **78,900**	222,000 **98,750**
				C-75	15,710 **108,300**	15,600 **107,600**	302,000 **134,330**
				N-80	16,760 **115,600**	16,640 **114,700**	322,000 **143,230**
				P-105	21,990 **151,600**	21,840 **150,600**	423,000 **188,150**
	.449 **11.40**	14.62	14.7 - 15.5 **21.87 - 23.06**	J-55	12,300 **84,800**	12,370 **85,300**	237,000 **105,420**
				C-75	16,770 **115,600**	16,870 **116,300**	323,000 **143,670**
				N-80	17,890 **123,400**	17,990 **124,000**	345,000 **153,460**
				P-105	23,480 **161,900**	23,610 **162,800**	452,000 **201,050**

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OD (in.) **(mm)**	Wall Thickness (in.) **(mm)**	Weight (lb/ft) **(kg/m)**		Grade	Collapse Pressure (psi) **(kPa)**	Internal Yield Pressure (psi) **(kPa)**	Tensile Strength (lb) **(daN)**
		Plain End	Nominal – Dependent on Type of Joint				
3.500 **88.9**	.476 **12.09**	15.68	15.8 **23.51**	J-55	12,930 **89,200**	13,090 **90,300**	249,000 **110,760**
				C-75	17,630 **121,600**	17,850 **123,100**	339,000 **150,790**
				N-80	18,800 **129,600**	19,040 **131,300**	362,000 **161,020**
				P-105	24,680 **170,200**	24,990 **172,300**	475,000 **211,280**
	.488 **12.39**			J-55	13,200 **91,000**	13,420 **92,500**	254,000 **112,980**
				C-75	18,000 **124,100**	18,300 **126,200**	346,000 **153,900**
				N-80	19,200 **132,400**	19,520 **134,600**	369,000 **164,130**
				P-105	25,200 **173,800**	25,610 **176,600**	485,000 **215,730**
	.510 **12.95**		16.7 **24.85**	J-55	13,690 **94,400**	14,020 **96,700**	264,000 **117,430**
				C-75	18,670 **128,700**	19,130 **131,900**	359,000 **159,680**
				N-80	19,920 **137,300**	20,400 **140,700**	383,000 **170,360**
				P-105	26,140 **180,200**	26,770 **145,600**	503,000 **223,730**

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OD (in.) **(mm)**	Wall Thickness (in.) **(mm)**	Weight (lb/ft) **(kg/m)**		Grade	Collapse Pressure (psi) **(kPa)**	Internal Yield Pressure (psi) **(kPa)**	Tensile Strength (lb) **(daN)**
		Plain End	Nominal – Dependent on Type of Joint				
3.500 **88.9**	.530 **13.46**		17.05 **25.37**	J-55	14,130 **97,400**	14,580 **100,500**	272,000 **120,990**
				C-75	19,270 **132,900**	19,880 **137,100**	371,000 **165,020**
				N-80	20,560 **141,800**	21,200 **146,200**	396,000 **176,140**
				P-105	26,980 **186,000**	27,830 **191,900**	519,000 **230,850**
4.000 **101.6**	.286 **7.26**		11.6 **17.26**	J-55	7,300 **50,300**	6,880 **47,400**	183,000 **81,400**
				C-75	9,790 **67,500**	9,390 **64,700**	250,000 **111,200**
				N-80	10,270 **70,800**	10,010 **69,000**	267,000 **118,760**
				P-105	12,690 **87,500**	13,140 **90,600**	350,000 **155,680**
	.330 **8.38**	12.93	13.0 - 13.4 - 14.0 **19.34 - 19.94 - 20.80**	J-55	8,330 **57,400**	7,940 **54,700**	209,000 **92,960**
				C-75	11,350 **78,300**	10,830 **74,700**	285,000 **126,770**
				N-80	12,110 **83,500**	11,550 **79,600**	304,000 **135,220**
				P-105	15,900 **109,600**	15,160 **104,500**	400,000 **179,920**

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OD (in.) **(mm)**	Wall Thickness (in.) **(mm)**	Weight (lb/ft) **(kg/m)**		Grade	Collapse Pressure (psi) **(kPa)**	Internal Yield Pressure (psi) **(kPa)**	Tensile Strength (lb) **(daN)**
		Plain End	Nominal – Dependent on Type of Joint				
4.000 **101.6**	.380 **9.65**	14.66	14.8 **22.02**	J-55	9,460 **65,200**	9,140 **63,000**	238,000 **105,860**
				C-75	12,900 **88,900**	12,470 **86,000**	324,000 **144,120**
				N-80	13,760 **94,900**	13,300 **91,700**	346,000 **153,900**
				P-105	18,060 **124,500**	17,460 **120,400**	454,000 **201,940**
	.430 **10.92**	16.36	16.5 **24.55**	J-55	10,550 **72,700**	10,350 **71,400**	265,000 **117,870**
				C-75	14,390 **99,200**	14,110 **97,300**	362,000 **161,020**
				N-80	15,350 **105,800**	15,050 **103,800**	386,000 **171,690**
				P-105	20,150 **138,900**	19,750 **136,200**	506,000 **225,070**
	.500 **12.70**		19.0 **28.27**	J-55	12,030 **82,900**	12,030 **82,900**	302,000 **134,330**
				C-75	16,410 **113,100**	16,410 **113,100**	412,000 **183,260**
				N-80	17,500 **120,700**	17,500 **120,700**	440,000 **195,710**
				P-105	22,970 **158,400**	22,970 **158,400**	577,000 **256,650**

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OD (in.) **(mm)**	Wall Thickness (in.) **(mm)**	Weight (lb/ft) **(kg/m)**		Grade	Collapse Pressure (psi) **(kPa)**	Internal Yield Pressure (psi) **(kPa)**	Tensile Strength (lb) **(daN)**
		Plain End	Nominal – Dependent on Type of Joint				
4.000 **101.6**	.610 **15.49**		22.5 - 22.8 **33.48 - 33.92**	J-55	14,220 **98,000**	14,680 **101,200**	357,000 **158,790**
				C-75	19,390 **133,700**	20,020 **138,000**	487,000 **216,620**
				N-80	20,680 **142,600**	21,350 **147,200**	520,000 **231,300**
				P-105	27,140 **187,100**	28,020 **193,200**	682,000 **303,350**
4.500 **114.3**	.205 **5.21**	9.4	9.5 **14.14**	J-55	3,310 **22,800**	4,380 **30,200**	151,000 **67,160**
	.224 **5.69**	10.23	10.5 **15.62**	J-55	4,010 **27,600**	4,790 **33,000**	165,000 **73,390**
	.250 **6.35**	11.35	11.6 **17.26**	J-55	4,960 **34,200**	5,350 **36,900**	184,000 **81,840**
				C-75	6,130 **42,300**	7,290 **50,300**	250,000 **111,200**
				N-80	6,350 **43,800**	7,780 **53,600**	267,000 **118,760**
				P-105	7,560 **52,100**	10,690 **73,700**	350,000 **155,680**
	2.90 **7.37**	13.04	13.5 **20.09**	J-55	6,420 **44,300**	6,200 **42,700**	211,000 **93,850**
				C-75	8,170 **56,300**	8,460 **58,300**	288,000 **128,100**

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OD (in.) **(mm)**	Wall Thickness (in.) **(mm)**	Weight (lb/ft) **(kg/m)**		Grade	Collapse Pressure (psi) **(kPa)**	Internal Yield Pressure (psi) **(kPa)**	Tensile Strength (lb) **(daN)**
		Plain End	Nominal – Dependent on Type of Joint				
4.500 **114.3**	.290 **7.37**	13.04	13.5 **20.09**	N-80	8,540 **58,900**	9,020 **62,200**	307,000 **136,550**
				P-105	10,350 **71,400**	11,840 **81,600**	403,000 **179,250**
	.337 **8.56**	14.98	15.1 - 15.5 **22.47 - 23.06**	J-55	7,620 **52,500**	7,210 **49,700**	242,000 **107,640**
				C-75	10,390 **71,600**	9,830 **67,800**	331,000 **147,230**
				N-80	11,090 **76,500**	10,480 **72,300**	353,000 **157,010**
				P-105	13,820 **95,300**	13,760 **94,900**	463,000 **205,940**
	.373 **9.47**	16.44	16.9 **25.14**	C-75	11,400 **78,600**	10,880 **75,000**	363,000 **161,460**
				N-80	12,160 **83,800**	11,600 **80,000**	387,000 **172,140**
				P-105	15,960 **110,000**	15,230 **105,000**	508,000 **225,960**
	.430 **10.92**	18.69	19.2 **28.57**	J-55	9,510 **65,600**	9,200 **63,400**	302,000 **134,330**
				C-75	12,960 **89,400**	12,540 **86,500**	412,000 **183,260**
				N-80	13,830 **95,400**	13,380 **92,300**	439,000 **195,270**
				P-105	18,150 **125,100**	17,560 **121,100**	577,000 **256,650**

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OD (in.) **(mm)**	Wall Thickness (in.) **(mm)**	Weight (lb/ft) **(kg/m)**		Grade	Collapse Pressure (psi) **(kPa)**	Internal Yield Pressure (psi) **(kPa)**	Tensile Strength (lb) **(daN)**
		Plain End	Nominal – Dependent on Type of Joint				
4.500 **114.3**	.500 **12.70**	21.36	21.6 **32.14**	J-55	10,860 **74,900**	10,690 **73,700**	346,000 **161,910**
				C-75	14,810 **102,100**	14,580 **100,500**	471,000 **209,500**
				N-80	15,800 **108,900**	15,560 **107,300**	503,000 **223,730**
				P-105	20,740 **143,000**	20,420 **140,800**	660,000 **293,570**
	.560 **14.22**		24.6 **36.60**	J-55	11,990 **82,700**	11,980 **82,600**	381,000 **169,470**
				C-75	16,340 **112,700**	16,330 **112,600**	520,000 **231,300**
				N-80	17,430 **120,200**	17,420 **120,100**	555,000 **246,860**
				P-105	22,880 **157,800**	22,870 **157,700**	728,000 **323,810**
	.630 **16.00**		26.5 **39.43**	J-55	13,240 **91,300**	13,480 **92,900**	421,000 **187,260**
				C-75	18,060 **124,500**	18,380 **126,700**	575,000 **255,760**
				N-80	19,260 **132,800**	19,600 **135,100**	613,000 **272,660**
				P-105	25,280 **174,300**	25,730 **177,400**	804,000 **357,620**

* Based on pipe body and calculated for J-55 = 55,000 lb yield, C-75 = 75,000 lb yield, N-80 = 80,000 lb yield, and P-105 = 105,000 lb yield.

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DIMENSIONS, SPECIFICATIONS, AND PHYSICAL PROPERTIES OF FIBREGLASS TUBING MANUFACTURED BY FIBREGLASS SYSTEMS, INC., BIG SPRING, TEXAS (MAXIMUM OPERATING TEMPERATURE 200°F)

Size (in.)	O.D. (in.)	I.D. (in.)	Coupling O.D. (in.)	Weight (lb/ft.)	Rated Internal Operating Pressure (psi)	Weep Pressure (psi)	Rated External Operating Pressure (psi)	Ultimate Collapse Pressure (psi)	Rated Joint Tensile Strength (lb)	Ultimate Joint Tensile Strength (lb)	Thread Form
1	1.42	1.04	2.14	0.70	2,000		2,000		5,600		EUE 10 Rd
1-1/2	2.00 2.10 2.26	1.56 1.52 1.52	2.90 2.90 3.60	1.16 1.34 1.66	2,000 2,500 3,000		1,800 2,500 3,000		7,000 10,000 15,000		EUE 10 Rd EUE 10 Rd 2-3/8, EU 8 Rd
2-3/8	2.24 2.36 2.42 2.58 2.72	1.92 1.42 1.42 1.94 1.94	3.60 3.60 3.60 3.75 4.60	1.18 1.34 1.54 1.81 2.30	1,200 1,650 2,000 2,500 3,000	3,000 3,600 4,600	800 1,100 1,500 2,500 3,000	2,400 5,500 6,500	12,000 14,000 15,000 20,000 25,000	38,000 42,000 44,000	EUE 8 Rd EUE 8 Rd EUE 8 Rd EUE 8 Rd 2-7/8, EU 8 Rd
2-7/8	2.72 2.86 2.96 3.20 3.32	2.42 2.42 2.42 2.42 2.42	4.20 4.20 4.20 4.60 5.27	1.38 1.52 1.90 2.66 3.31	1,000 1,650 2,000 2,500 3,000	2,400 3,400 4,200	700 1,000 1,250 2,000 2,500	1,700 4,800 5,500	14,000 17,000 18,000 25,000 30,000	42,000 47,000 50,000	EUE 8 Rd EUE 8 Rd EUE 8 Rd EUE 8 Rd 3-1/2, EU 8 Rd
3-1/2	3.42 3.50 3.58 3.88 3.94	3.02 3.02 3.02 3.02 3.02	4.70 4.90 4.90 5.27 6.27	1.70 2.30 2.56 4.57 5.08	1,000 1,500 2,000 2,500 3,000	2,000 3,100 3,900	500 900 1,000 1,500 2,000	1,450 3,600 3,600	17,000 18,000 20,000 30,000 40,000	48,000 55,000 64,000	EUE 8 Rd EUE 8 Rd EUE 8 Rd EUE 8 Rd 4-1/2, EU 8 Rd
4-1/2	4.48 4.56 4.64	4.04 4.04 4.04	6.00 6.20 6.20	2.85 3.70 4.31	1,000 1,500 2,000	1,400 3,000 3,400	400 800 1,000	1,350 2,500 3,200	21,800 23,000 25,000	82,000 88,000 90,400	EUE 8 Rd EUE 8 Rd EUE 8 Rd

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DIMENSIONS, SPECIFICATIONS, AND PHYSICAL PROPERTIES OF TFP FIBREGLASS TUBING MANUFACTURED BY TEXAS FIBREGLASS PRODUCTS, INC., GALVESTON, TEXAS

Size (In.)	2-3/8		2-7/8		3-1/2	4-1/2
O.D. (in.)	2.42	2.52	2.92	3.08	3.54	4.70
I.D. (in.)	2.00	2.00	2.48	2.48	3.00	4.00
Joint O.D. (in.)	3.45	3.50	4.00	4.10	4.75	5.75
Weight (lb/ft.)	1.31	1.61	1.65	2.20	2.42	4.30
Rated Internal Operating Pressure (psi)	1.500	2.000	1.500	2.000	1.500	1.500
Weep Pressure (psi)	3.300	4.250	3.000	4.000	3.000	3.000
Ultimate Burst Pressure (psi)	11,200	14,500	10,000	13,800	10,700	10,400
Rated External Operating Pressure (psi)	1.500	2.000	1.500	2.000	1.500	1.500
Ultimate Collapse Pressure (psi)	5.300	6.400	3.900	6.000	4.000	3.600
Rated Joint Tensile Strength (lb)	15,000	19,000	17,000	22,500	27,500	38,500
Ultimate Joint Tensile Strength (lb)	38,000	38,000	45,000	45,000	55,000	77,000
Maximum Operating Temperature (°F)	200	200	200	200	200	200
Heat Distortion Temperature (°F)	320	320	320	320	320	320
Modulus of Elasticity (psi)	3.5×10^6	3.4×10^6	3.1×10^6	3.0×10^6	3.2×10^6	3.1×10^6
Thread Form	EU 8 Round					
Recommended Make-Up Torque (ft/lb.)	100	100	150	150	175	225

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INTRODUCTION TO TFP

Since 1970, Texas Fibreglas Products has been producing quality fiberglass pipe. While all TFP tubular goods are designed with the needs of the oil field in mind, other industries requiring high strength corrosion resistant products have also readily accepted TFP.

TFP fiberglass reinforced epoxy line pipe and downhole tubing is filament wound on electronically controlled equipment of modern design to assure consistency and quality. Each piece of pipe carries a serial number used during production, testing and inspection. Each joint of downhole tubing is hydrostatically tested. Each joint of line pipe is inspected and random hydrostatic testing assures stable manufacturing conditions.

The end connection on all standard TFP pipe is the time-honored API EUE 8 round thread. The regular thread form is used on all line pipe, and the long thread form is now used on all downhole tubing to ensure adequate tensile strenght in deep well applications. TFP tubing can be and has been run in several instances to depths of 10,000 feet.

Since TFP is manufactured on polished steel mandrels, the interior of the pipe is exceptionally smooth, permitting high flow rates and resistance to paraffin buildup. This advantage has stimulated the use of TFP in areas other than those with corrosion problems traditionally utilizing fiberglass.

Texas Fibreglass Products

PRODUCT IDENTIFICATION

Each joint of TFP line pipe and tubing carries an individual serial number marked in black on the barrel. This number permits the factory to identify all conditions of manufacturing and testing at the time the joint is made.

Additionally, for the purpose of quick identification in the field, a color code has been adopted. Two colored stripes are placed near the box end of every joint in accordance with the following code:

Red ..... Downhole Tubing
Green..... Line Pipe

* * * * * * *

Blue ..... Over 1800 psi Working Pressure
Yellow..... 1500 - 1750 psi Working Pressure
Silver..... 1200 - 1450 psi Working Pressure
Black..... Under 1150 psi Working Pressure

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TFP FIBREGLASS CASING AND TUBING - DIMENSIONS AND WEIGHTS

TFP Tubing	O.D. (Inches)	I.D. (Inches)	Wall Thickness (Inches)	Weight Per Joint (Lbs.)	Weight Per Foot Coupled Joints (Lbs.)	Minimum Drift Diameter (Inches)	Pin Upset O.D. (Inches)	Pin Upset Minimum Length (Inches)	Box O.D. (Inches)	Box Length (Inches)	Recess Diameter "Q" (Inches)	Width Of Bearing Face "B" (Inches)	TFP Integral Joint End Connection Thread
2-3/8"													
1400#	2.33	1.995	.17	31	1.04	1.901	2.719	4-5/8	3.22	12	2.656	1/8	2-3/8" EUE 8rd Long
1600#	2.39	-	.20	36	1.21	-	-	-	3.27	-	-	1/8	-
1800#	2.44	-	.22	41	1.38	-	-	-	3.33	-	-	1/8	-
2000#	2.50	-	.25	46	1.54	-	-	-	3.38	-	-	1/8	-
2200#	2.56	-	.28	51	1.71	-	-	-	3.44	-	-	1/8	-
2-7/8"													
1300#	2.87	2.480	.20	44	1.48	2.386	3.219	5	3.77	12	3.156	1/8	2-7/8" EUE 8rd Long
1500#	2.93	-	.22	50	1.68	-	-	-	3.83	-	-	1/8	-
1850#	3.04	-	.28	62	2.08	-	-	-	3.94	-	-	1/8	-
2000#	3.10	-	.31	68-1/2	2.30	-	-	-	4.00	-	-	3/16	-
2150#	3.15	-	.34	75-1/2	2.53	-	-	-	4.05	-	-	3/16	-
3-1/2"													
1250#	3.44	2.992	.22	61	2.05	2.898	3.875	5-1/4	4.41	12	3.813	1/8	3-1/2" EUE 8rd Long
1550#	3.55	-	.28	76	2.56	-	-	-	4.52	-	-	1/8	-
1800#	3.66	-	.34	91	3.06	-	-	-	4.71	-	-	3/16	-
2100#	3.78	-	.39	107	3.60	-	-	-	4.82	-	-	1/4	-
4-1/2"													
1200#	4.54	3.980	.28	98	3.30	3.886	4.875	5-1/2	5.52	12	4.813	1/8	4-1/2" EUE 8rd Long
1400#	4.65	-	.34	118	3.97	-	-	-	5.64	-	-	1/8	-
1600#	4.76	-	.39	138	4.64	-	-	-	5.82	-	-	1/4	-
1800#	4.88	-	.45	159	5.35	-	-	-	5.93	-	-	5/16	-
7"													
1250#	6.90	6.004	.45	235	7.92	5.879	7.125	6-1/8	8.14	12	7.094	1/4	7" Casing 8rd Long
1400#	7.01	-	.50	265	8.93	-	-	-	8.25	-	-	5/16	-

Standard Joint Length.....30 Feet (Range 2)
Process Of Manufacture .....Filament Wound

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TFP FIBERGLASS CASING AND TUBING - PERFORMANCE PROPERTIES

TFP Tubing	Rated Operating Pressure* (psi)	Hydrostatic Mill Test Pressure (psi)	Short Term Weep Pressure (psi)	Hydrostatic Collapse Pressure (psi)	Rated Axial Tensile Load (Lbs.)	Ultimate Axial Tensile Load (Across Jt.) (Lbs.)	Stretch of Free Hanging Pipe (Where N = Number of Joints)			Stretch vs. Tension Above Pipe Weight Where P = Load: kilopounds L=String Length: Feet (Feet x 10^{-4})
							In Air (Feet x 10^{-4})	In Fresh H_20 (Feet x 10^{-5})	In 10% Brine (Feet x 10^{-5})	
2-3/8"										
1400#	1400	1750	4170	3010	13,700	44,000	1.348 N^2	6.532 N^2	6.045 N^2	2.918 PL
1600#	1600	2000	4800	4460	16,200	44,000	1.325 N^2	6.420 N^2	5.942 N^2	2.471 PL
1800#	1800	2250	5420	5650	18,750	44,000	1.303 N^2	6.314 N^2	5.843 N^2	2.234 PL
2000#	2000	2500	6020	6280	21,350	44,000	1.284 N^2	6.221 N^2	5.758 N^2	1.674 PL
2200#	2200	2750	6610	6890	22,000	44,000	1.265 N^2	6.129 N^2	5.673 N^2	1.666 PL
2-7/8"										
1300#	1300	1625	3930	2560	19,800	60,000	1.324 N^2	6.415 N^2	5.938 N^2	2.023 PL
1500#	1500	1875	4450	3600	22,850	60,000	1.303 N^2	6.314 N^2	5.843 N^2	—
1850#	1850	2300	5450	5680	29,150	60,000	1.267 N^2	6.139 N^2	5.682 N^2	1.373 PL
2000#	2000	2500	5930	6190	30,000	60,000	1.259 N^2	6.100 N^2	5.646 N^2	1.335 PL
2150#	2150	2700	6400	6680	30,000	60,000	1.260 N^2	6.105 N^2	5.651 N^2	1.122 PL
3-1/2"										
1250#	1250	1575	3740	2220	27,150	80,000	1.336 N^2	6.473 N^2	5.992 N^2	1.473
1550#	1550	1925	4590	3940	34,550	80,000	1.309 N^2	6.343 N^2	5.872 N^2	1.159
1800#	1800	2250	5420	5650	40,000	80,000	1.284 N^2	6.221 N^2	5.758 N^2	—
2100#	2100	2625	6220	6490	40,000	80,000	1.273 N^2	6.168 N^2	5.709 N^2	—
4-1/2"										
1200#	1200	1500	3528	1890	44,950	115,000	1.295 N^2	6.275 N^2	5.808 N^2	0.890 PL
1400#	1400	1750	4180	3030	54,650	115,000	1.282 N^2	6.212 N^2	5.749 N^2	0.732
1600#	1600	2000	4810	4490	57,500	115,000	1.269 N^2	6.149 N^2	5.691 N^2	—
1800#	1800	2250	5430	5670	57,500	115,000	1.263 N^2	6.120 N^2	5.664 N^2	—
7"										
1250#	1250	1575	3730	2200	96,500	193,000	1.280 N^2	6.202 N^2	5.740 N^2	0.367
1400#	1400	1750	4160	2990	96,500	193,000	1.272 N^2	6.163 N^2	5.704 N^2	0.324

*INTERNAL-EXTERNAL

Axial Tensile Modulus ..... 3.0 x 10^6 psi
Barcol Hardness ..... 55 - 65
Density ..... 0.07 lbs/cu. in.

Rated Operating Temperature ..... 200 ° F
Heat Distortion Temperature ..... 320 ° F
Thermal Coefficient of Expansion ..... 11 x 10^{-6} ft/ft/°F

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Handling Procedures For Reinforced Thermosetting Resin Pipe (RTRP)

Unloading: Care should be taken in unloading RTRP from truck. Do not drop or throw pipe or allow it to be hit with a hard or sharp object. Each joint or bundle should be handled individually. Pipe should be stacked with proper support and spacing so it is not unduly flexed.

End Protection And Care: Thread protectors should be left in place during all handling of pipe. Thread protectors should be removed just prior to installation. If threads are contaminated with dirt, they should be properly cleaned with solvent and a wire brush. If this is done, threads should be dried with cloth, since solvent left in the threads will inhibit the effectiveness of the thread compound.

Thread Compound And Engagement: Just prior to make-up, TFP Thread Compound should be applied liberally to both pin and box threads. Care should be taken to prevent misalignment during engagement and make-up. If damage occurs during engagement, thread should be disengaged and recleaned to remove any chips or broken pieces.

Tooling: Tubing tongs are recommended for torquing pipe. Strap wrenches are acceptable. Power tongs should be used with extreme caution. Pipe wrenches (Stilson wrenches) should not be used. Care should be taken to make the thread up properly. Make up joints approximately one turn beyond the handtight position. See make-up torque values below.

Line Pipe Installation: Pipe should be properly supported, aligned and protected to prevent damage. The ultraviolet in direct sunlight will slowly attack the resin system used in the manufacture of fibreglass pipe. Lines installed above grade should be protected by coating or shading if they are to remain in position for a considerable length of time. Although field conditions may indicate that make-up torque should be increases or decreased, the following is a rough guide for line pipe installations:

2"	225 foot-lbs.
2-1/2"	325 foot-lbs.
3"	400 foot-lbs.
4"	500 foot-lbs.
6"	800 foot-lbs.

Downhole Tubing Installation: Standard elevators may be used up to a string weight of about 5,000 pounds. Above this weight, the integral joint may wedge in the elevator. Slip type elevators without a setting ring can be used in all cases.

RTRP should not be set in compression or used to set a compression type packer. Permanent or drillable packers may be used. Tension-type packers should be set with a weight indicator to obtain proper tension. Packers should be equipped with soft rubber (50-65 Durometer A).

Rod pumping installations must be equipped with tubing anchor to minimize breathing and buckling. Sucker rods installed in RTRP tubing should be plastic coated. Nylon, urethane, or hard rubber rod guides should be used to minimize wear.

Make-up torque of downhole tubing should be approximately the following values:

2-3/8"	100 foot-lbs.
2-7/8"	150 foot-lbs.
3-1/2"	175 foot-lbs.
4-1/2"	225 foot-lbs.
7"	325 foot-lbs.

NOTE: Complete installation details may be found in A.P.I. Standard RP5A4 for casing and tubing, and RP5L4 for line pipe.

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Attention:

TFP has recently incorporated the use of the API-EUE long thread form into its downhole tubing. (See API Standard 5B, table 2.6a). This has been done to increase the tensile strength of the joint, allowing even greater tensile loading of a string.

If a TFP long thread pin end is to be made up into a regular thread box end (as used in steel pipe), the end of the pin thread must be cut off according to the table below to prevent bottoming out.

2-3/8" - Cut off 5 threads = 5/8"
2-7/8" - Cut off 6 threads = 3/4"
3-1/2" - Cut off 6 threads = 3/4"
4-1/2" - Cut off 7 threads = 7/8"

There is no problem in inserting a regular thread pin (steel) into a long thread (TFP) box.

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Coiled tubing dimensions and specifications

Demand for coiled tubing continues to grow in almost every aspect of today's E&P market because of its flexibility, versatility and economy. It is being used for a variety of drilling, completion and production operations that previously required conventional jointed pipe, workover and snubbing units, or rotary drilling rigs. Last year, our popular coiled tubing tables were reformatted, expanded and improved to give industry engineering and field personnel additional, more specific selection, operational and installation information.

Traditional specifications and dimensions are now augmented by addition of calculated performance properties for downhole workover and well servicing applications. This information is now a stand-alone feature, separate from conventional jointed tubing connection design tables, which are published annually in the January issue. With almost seven times as much usable data as in previous listings, the tabular coiled tubing data shown here should be practical and useful for job planning and execution.

HOW TO USE THIS REFERENCE

Coiled tubing tube body weight in lb/ft is based on specified dimensions. Coiled tubing tube body yield is based on specified outside diameter (OD), minimum wall thickness and minimum specified material yield strength. Calculated internal yield pressure is based on minimum wall thickness, minimum specified material yield strength, specified OD and the Barlow formula. Effect of axial loading on internal yield pressure is not included.

The performance properties and internal yield pressures listed in these tables apply only to new coiled tubing and do not take into account additional deformation, axial load, residual bends and stresses, or ovality that result from cyclic bending events imposed on coiled tubing during actual service work. The sizes and available steel grades listed represent coiled tubing strings commonly used in oil and gas production and drilling operations, but do not necessarily represent all available sizes and material grades. Consult coiled tubing manufacturers for additional information and details.

Coiled tubing dimensions and specifications

Specified outside diameter (OD), in.	Tube body weight, lb/ft	Material yield strength, psi	Wall thickness		Inside diameter, (ID), in.
			Specified, in.	Minimum, in.	
0.750	0.59	55,000	0.083	0.078	0.584
0.750	0.59	75,000	0.083	0.078	0.584
0.750	0.62	80,000	0.087	0.082	0.576
1.000	0.81	55,000	0.083	0.078	0.834
1.000	0.79	70,000	0.080	0.075	0.840
1.000	0.81	70,000	0.083	0.078	0.834
1.000	0.85	70,000	0.087	0.082	0.826
1.000	0.92	70,000	0.095	0.090	0.810
1.000	0.98	70,000	0.102	0.097	0.796
1.000	1.04	70,000	0.109	0.104	0.782
1.000	1.17	70,000	0.125	0.117	0.750
1.000	0.81	75,000	0.083	0.078	0.834
1.000	0.85	75,000	0.087	0.082	0.826
1.000	0.79	80,000	0.080	0.075	0.840
1.000	0.85	80,000	0.087	0.082	0.826
1.000	0.92	80,000	0.095	0.090	0.810
1.000	0.98	80,000	0.102	0.097	0.796
1.000	1.04	80,000	0.109	0.104	0.782
1.000	1.17	80,000	0.125	0.117	0.750
1.000	0.79	90,000	0.080	0.075	0.840
1.000	0.85	90,000	0.087	0.082	0.826
1.000	0.92	90,000	0.095	0.090	0.810
1.000	0.98	90,000	0.102	0.097	0.796
1.000	1.04	90,000	0.109	0.104	0.782
1.000	1.17	90,000	0.125	0.117	0.750

Calculated coiled tubing performance properties

Body yield load lb	Internal yield pressure psig	Torsional yield strength lb–ft	Internal capacity bbl/1,000 ft	Body wall displacement bbl/1,000 ft	External displacement bbl/1,000 ft
9,057	11,440	139	0.331	0.215	0.546
12,350	15,600	189	0.331	0.215	0.546
13,767	17,493	208	0.322	0.224	0.546
12,426	8,580	268	0.676	0.296	0.971
15,256	10,500	332	0.685	0.286	0.971
15,815	10,920	341	0.676	0.296	0.971
16,554	11,480	353	0.663	0.309	0.971
18,011	12,600	377	0.637	0.334	0.971
19,282	13,580	396	0.615	0.356	0.971
20,492	14,560	414	0.594	0.377	0.971
22,719	16,380	452	0.546	0.425	0.971
16,945	11,700	366	0.676	0.296	0.971
17,736	12,300	379	0.663	0.309	0.971
17,436	12,000	380	0.685	0.286	0.971
18,919	13,120	404	0.663	0.309	0.971
20,584	14,400	430	0.637	0.334	0.971
22,014	15,520	452	0.615	0.356	0.971
23,420	16,640	473	0.594	0.377	0.971
25,965	18,720	517	0.546	0.425	0.971
19,615	13,500	427	0.685	0.286	0.971
21,284	14,760	454	0.663	0.309	0.971
23,157	16,200	484	0.637	0.334	0.971
24,766	17,460	509	0.615	0.356	0.971
26,347	18,720	532	0.594	0.377	0.971
29,211	21,060	581	0.546	0.425	0.971

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Coiled tubing dimensions and specifications						Calculated coiled tubing performance properties					
Specified outside diameter (OD), in.	Tube body weight, lb/ft	Material yield strength, psi	Wall thickness Specified, in.	Wall thickness Minimum, in.	Inside diameter, (ID), in.	Body yield load lb	Internal yield pressure psig	Torsional yield strength lb–ft	Internal capacity bbl/1,000 ft	Body wall displacement bbl/1,000 ft	External displacement bbl/1,000 ft
1.000	0.79	100,000	0.080	0.075	0.840	21,795	15,000	474	0.685	0.286	0.971
1.000	0.85	100,000	0.087	0.082	0.826	23,649	16,400	505	0.663	0.309	0.971
1.000	0.92	100,000	0.095	0.090	0.810	25,730	18,000	538	0.637	0.334	0.971
1.000	0.98	100,000	0.102	0.097	0.796	27,518	19,400	565	0.615	0.356	0.971
1.000	1.04	100,000	0.109	0.104	0.782	29,275	20,800	591	0.594	0.377	0.971
1.000	1.17	100,000	0.125	0.117	0.750	32,456	23,400	646	0.546	0.425	0.971
1.250	1.03	55,000	0.083	0.078	1.084	15,796	6,864	441	1.141	0.376	1.518
1.250	1.17	55,000	0.095	0.090	1.060	18,039	7,920	490	1.091	0.426	1.518
1.250	1.00	70,000	0.080	0.075	1.090	19,380	8,400	545	1.154	0.364	1.518
1.250	1.03	70,000	0.083	0.078	1.084	20,103	8,736	561	1.141	0.376	1.518
1.250	1.08	70,000	0.087	0.082	1.076	21,062	9,184	582	1.125	0.393	1.518
1.250	1.17	70,000	0.095	0.090	1.060	22,959	10,080	624	1.091	0.426	1.518
1.250	1.25	70,000	0.102	0.097	1.046	24,595	10,864	658	1.063	0.455	1.518
1.250	1.33	70,000	0.109	0.104	1.032	26,210	11,648	692	1.035	0.483	1.518
1.250	1.50	70,000	0.125	0.117	1.000	29,152	13,104	763	0.971	0.546	1.518
1.250	1.60	70,000	0.134	0.126	0.982	31,145	14,112	800	0.937	0.581	1.518
1.250	1.82	70,000	0.156	0.148	0.938	35,867	16,576	882	0.855	0.663	1.518
1.250	2.01	70,000	0.175	0.167	0.900	39,773	18,704	945	0.787	0.731	1.518
1.250	1.03	75,000	0.083	0.078	1.084	21,539	9,360	601	1.141	0.376	1.518
1.250	1.08	75,000	0.087	0.082	1.076	22,567	9,840	624	1.125	0.393	1.518
1.250	1.17	75,000	0.095	0.090	1.060	24,599	10,800	668	1.091	0.426	1.518
1.250	1.33	75,000	0.109	0.104	1.032	28,082	12,480	741	1.035	0.483	1.518
1.250	1.00	80,000	0.080	0.075	1.090	22,148	9,600	623	1.154	0.364	1.518
1.250	1.08	80,000	0.087	0.082	1.076	24,071	10,496	666	1.125	0.393	1.518
1.250	1.17	80,000	0.095	0.090	1.060	26,239	11,520	713	1.091	0.426	1.518
1.250	1.25	80,000	0.102	0.097	1.046	28,109	12,416	752	1.063	0.455	1.518
1.250	1.33	80,000	0.109	0.104	1.032	29,954	13,312	790	1.035	0.483	1.518
1.250	1.50	80,000	0.125	0.117	1.000	33,316	14,976	872	0.971	0.546	1.518
1.250	1.60	80,000	0.134	0.126	0.982	35,594	16,128	914	0.937	0.581	1.518
1.250	1.82	80,000	0.156	0.148	0.938	40,991	18,944	1,008	0.855	0.663	1.518
1.250	2.01	80,000	0.175	0.167	0.900	45,455	21,376	1,079	0.787	0.731	1.518
1.250	1.00	90,000	0.080	0.075	1.090	24,917	10,800	700	1.154	0.364	1.518
1.250	1.08	90,000	0.087	0.082	1.076	27,080	11,808	749	1.125	0.393	1.518
1.250	1.17	90,000	0.095	0.090	1.060	29,518	12,960	802	1.091	0.426	1.518
1.250	1.25	90,000	0.102	0.097	1.046	31,622	13,968	846	1.063	0.455	1.518
1.250	1.33	90,000	0.109	0.104	1.032	33,698	14,976	889	1.035	0.483	1.518
1.250	1.50	90,000	0.125	0.117	1.000	37,481	16,848	980	0.971	0.546	1.518
1.250	1.60	90,000	0.134	0.126	0.982	40,043	18,144	1,028	0.937	0.581	1.518
1.250	1.82	90,000	0.156	0.148	0.938	46,114	21,312	1,134	0.855	0.663	1.518
1.250	2.01	90,000	0.175	0.167	0.900	51,137	24,048	1,214	0.787	0.731	1.518
1.250	1.00	100,000	0.080	0.075	1.090	27,685	12,000	778	1.154	0.364	1.518
1.250	1.08	100,000	0.087	0.082	1.076	30,089	13,120	832	1.125	0.393	1.518
1.250	1.17	100,000	0.095	0.090	1.060	32,798	14,400	891	1.091	0.426	1.518
1.250	1.25	100,000	0.102	0.097	1.046	35,136	15,520	940	1.063	0.455	1.518
1.250	1.33	100,000	0.109	0.104	1.032	37,443	16,640	988	1.035	0.483	1.518
1.250	1.50	100,000	0.125	0.117	1.000	41,645	18,720	1,089	0.971	0.546	1.518
1.250	1.60	100,000	0.134	0.126	0.982	44,492	20,160	1,142	0.937	0.581	1.518
1.250	1.82	100,000	0.156	0.148	0.938	51,238	23,680	1,260	0.855	0.663	1.518
1.250	2.01	100,000	0.175	0.167	0.900	56,819	26,720	1,349	0.787	0.731	1.518
1.500	1.31	55,000	0.087	0.082	1.326	20,091	6,013	683	1.708	0.478	2.186
1.500	1.43	55,000	0.095	0.090	1.310	21,927	6,600	734	1.667	0.519	2.186
1.500	1.62	55,000	0.109	0.104	1.282	25,066	7,627	818	1.597	0.589	2.186
1.500	1.43	70,000	0.095	0.090	1.310	27,907	8,400	934	1.667	0.519	2.186
1.500	1.52	70,000	0.102	0.097	1.296	29,528	9,053	988	1.632	0.554	2.186
1.500	1.62	70,000	0.109	0.104	1.282	31,928	9,707	1,041	1.597	0.589	2.186
1.500	1.84	70,000	0.125	0.117	1.250	35,584	10,920	1,156	1.518	0.668	2.186
1.500	1.95	70,000	0.134	0.126	1.232	38,072	11,760	1,216	1.474	0.711	2.186
1.500	2.24	70,000	0.156	0.148	1.188	44,003	13,813	1,354	1.371	0.815	2.186
1.500	2.48	70,000	0.175	0.167	1.150	48,955	15,587	1,461	1.285	0.901	2.186
1.500	1.43	75,000	0.095	0.090	1.310	29,900	9,000	1,000	1.667	0.519	2.186
1.500	1.62	75,000	0.109	0.104	1.282	34,208	10,400	1,115	1.597	0.589	2.186
1.500	1.43	80,000	0.095	0.090	1.310	31,893	9,600	1,067	1.667	0.519	2.186
1.500	1.52	80,000	0.102	0.097	1.296	34,203	10,347	1,129	1.632	0.554	2.186
1.500	1.62	80,000	0.109	0.104	1.282	36,489	11,093	1,190	1.597	0.589	2.186
1.500	1.84	80,000	0.125	0.117	1.250	40,668	12,480	1,321	1.518	0.668	2.186
1.500	1.95	80,000	0.134	0.126	1.232	43,511	13,440	1,390	1.474	0.711	2.186
1.500	2.24	80,000	0.156	0.148	1.188	50,290	15,787	1,547	1.371	0.815	2.186
1.500	2.48	80,000	0.175	0.167	1.150	55,948	17,813	1,670	1.285	0.901	2.186
1.500	1.43	90,000	0.095	0.090	1.310	35,880	10,800	1,200	1.667	0.519	2.186
1.500	1.52	90,000	0.102	0.097	1.296	38,479	11,640	1,271	1.632	0.554	2.186

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Coiled tubing dimensions and specifications						Calculated coiled tubing performance properties					
Specified outside diameter (OD), in.	Tube body weight, lb/ft	Material yield strength, psi	Wall thickness Specified, in.	Wall thickness Minimum, in.	Inside diameter, (ID), in.	Body yield load lb	Internal yield pressure psig	Torsional yield strength lb–ft	Internal capacity bbl/1,000 ft	Body wall displacement bbl/1,000 ft	External displacement bbl/1,000 ft
1.500	1.62	90,000	0.109	0.104	1.282	41,050	12,480	1,338	1.597	0.589	2.186
1.500	1.84	90,000	0.125	0.117	1.250	45,751	14,040	1,486	1.518	0.668	2.186
1.500	1.95	90,000	0.134	0.126	1.232	48,950	15,120	1,564	1.474	0.711	2.186
1.500	2.24	90,000	0.156	0.148	1.188	56,576	17,760	1,741	1.371	0.815	2.186
1.500	2.48	90,000	0.175	0.167	1.150	62,942	20,040	1,878	1.285	0.901	2.186
1.500	1.43	100,000	0.095	0.090	1.310	39,867	12,000	1,334	1.667	0.519	2.186
1.500	1.52	100,000	0.102	0.097	1.296	42,754	12,933	1,412	1.632	0.554	2.186
1.500	1.62	100,000	0.109	0.104	1.282	45,611	13,867	1,487	1.597	0.589	2.186
1.500	1.84	100,000	0.125	0.117	1.250	50,834	15,600	1,651	1.518	0.668	2.186
1.500	1.95	100,000	0.134	0.126	1.232	54,389	16,800	1,737	1.474	0.711	2.186
1.500	2.24	100,000	0.156	0.148	1.188	62,862	19,733	1,934	1.371	0.815	2.186
1.500	2.48	100,000	0.175	0.167	1.150	69,935	22,267	2,087	1.285	0.901	2.186
1.750	1.48	55,000	0.083	0.078	1.584	22,534	4,903	916	2.437	0.538	2.975
1.750	1.55	55,000	0.087	0.082	1.576	23,633	5,154	953	2.413	0.562	2.975
1.750	1.68	55,000	0.095	0.090	1.560	25,814	5,857	1,026	2.364	0.611	2.975
1.750	1.91	70,000	0.109	0.104	1.532	37,645	8,320	1,463	2.280	0.695	2.975
1.750	2.17	70,000	0.125	0.117	1.500	42,017	9,360	1,631	2.186	0.789	2.975
1.750	2.31	70,000	0.134	0.126	1.482	44,999	10,080	1,721	2.134	0.841	2.975
1.750	2.66	70,000	0.156	0.148	1.438	52,140	11,840	1,928	2.009	0.966	2.975
1.750	2.94	70,000	0.175	0.167	1.400	58,136	13,360	2,093	1.904	1.071	2.975
1.750	3.14	70,000	0.188	0.180	1.374	62,147	14,400	2,197	1.834	1.141	2.975
1.750	1.68	75,000	0.095	0.090	1.560	35,202	7,714	1,399	2.364	0.611	2.975
1.750	1.68	80,000	0.095	0.090	1.560	37,548	8,229	1,493	2.364	0.611	2.975
1.750	1.91	80,000	0.109	0.104	1.532	43,023	9,509	1,672	2.28	0.695	2.975
1.750	2.17	80,000	0.125	0.117	1.500	48,019	10,697	1,864	2.186	0.789	2.975
1.750	2.31	80,000	0.134	0.126	1.482	51,428	11,520	1,967	2.134	0.841	2.975
1.750	2.66	80,000	0.156	0.148	1.438	59,589	13,531	2,204	2.009	0.966	2.975
1.750	2.94	80,000	0.175	0.167	1.400	66,441	15,269	2,391	1.904	1.071	2.975
1.750	3.14	80,000	0.188	0.180	1.374	71,025	16,457	2,511	1.834	1.141	2.975
1.750	3.17	80,000	0.190	0.182	1.370	71,723	16,640	2,529	1.823	1.152	2.975
1.750	1.80	90,000	0.102	0.097	1.546	45,335	9,977	1,781	2.322	0.653	2.975
1.750	1.91	90,000	0.109	0.104	1.532	48,401	10,697	1,880	2.280	0.695	2.975
1.750	2.17	90,000	0.125	0.117	1.500	54,021	12,034	2,097	2.186	0.789	2.975
1.750	2.31	90,000	0.134	0.126	1.482	57,855	12,960	2,213	2.134	0.841	2.975
1.750	2.66	90,000	0.156	0.148	1.438	67,037	15,223	2,479	2.009	0.966	2.975
1.750	2.94	90,000	0.175	0.167	1.400	74,746	17,177	2,690	1.904	1.071	2.975
1.750	3.17	90,000	0.190	0.182	1.370	80,688	18,720	2,845	1.823	1.152	2.975
1.750	1.68	100,000	0.095	0.090	1.560	46,935	10,286	1,866	2.364	0.611	2.975
1.750	1.91	100,000	0.109	0.104	1.532	53,779	11,886	2,089	2.280	0.695	2.975
1.750	2.17	100,000	0.125	0.117	1.500	60,024	13,371	2,330	2.186	0.789	2.975
1.750	2.31	100,000	0.134	0.126	1.482	64,285	14,400	2,459	2.134	0.841	2.975
1.750	2.66	100,000	0.156	0.148	1.438	74,486	16,914	2,755	2.009	0.966	2.975
1.750	2.94	100,000	0.175	0.167	1.400	83,051	19,086	2,989	1.904	1.071	2.975
1.750	3.14	100,000	0.188	0.180	1.374	88,781	20,571	3,139	1.834	1.141	2.975
2.000	2.20	70,000	0.109	0.104	1.782	43,363	7,280	1,956	3.085	0.801	3.886
2.000	2.50	70,000	0.125	0.117	1.750	48,449	8,190	2,189	2.975	0.911	3.886
2.000	2.67	70,000	0.134	0.126	1.732	51,926	8,820	2,315	2.914	0.972	3.886
2.000	3.07	70,000	0.156	0.148	1.688	60,277	10,360	2,606	2.768	1.118	3.886
2.000	3.41	70,000	0.175	0.167	1.650	67,317	11,690	2,840	2.645	1.241	3.886
2.000	3.64	70,000	0.188	0.180	1.624	72,043	12,600	2,991	2.562	1.324	3.886
2.000	3.67	70,000	0.190	0.182	1.620	72,763	12,740	3,013	2.549	1.336	3.886
2.000	3.90	70,000	0.203	0.195	1.594	77,403	13,650	3,156	2.468	1.417	3.886
2.000	2.20	80,000	0.109	0.104	1.782	49,558	8,320	2,236	3.085	0.801	3.886
2.000	2.50	80,000	0.125	0.117	1.750	55,370	9,360	2,502	2.975	0.911	3.886
2.000	2.67	80,000	0.134	0.126	1.732	59,344	10,080	2,646	2.914	0.972	3.886
2.000	3.07	80,000	0.156	0.148	1.688	68,888	11,840	2,978	2.768	1.118	3.886
2.000	3.41	80,000	0.175	0.167	1.650	76,934	13,360	3,245	2.645	1.241	3.886
2.000	3.64	80,000	0.188	0.180	1.624	82,335	14,400	3,418	2.562	1.324	3.886
2.000	3.67	80,000	0.190	0.182	1.620	83,158	14,560	3,444	2.549	1.336	3.886
2.000	3.90	80,000	0.203	0.195	1.594	88,461	15,600	3,607	2.468	1.417	3.886
2.000	2.20	90,000	0.109	0.104	1.782	55,752	9,360	2,515	3.085	0.801	3.886
2.000	2.50	90,000	0.125	0.117	1.750	62,291	10,530	2,815	2.975	0.911	3.886
2.000	2.67	90,000	0.134	0.126	1.732	66,762	11,340	2,976	2.914	0.972	3.886
2.000	3.07	90,000	0.156	0.148	1.688	77,499	13,320	3,351	2.768	1.118	3.886
2.000	3.41	90,000	0.175	0.167	1.650	86,551	15,030	3,651	2.645	1.241	3.886
2.000	3.67	90,000	0.190	0.182	1.620	93,553	16,380	3,874	2.549	1.336	3.886
2.000	2.20	100,000	0.109	0.104	1.782	61,947	10,400	2,795	3.085	0.801	3.886
2.000	2.50	100,000	0.125	0.117	1.750	69,213	11,700	3,128	2.975	0.911	3.886
2.000	2.67	100,000	0.134	0.126	1.732	74,181	12,600	3,307	2.914	0.972	3.886
2.000	3.07	100,000	0.156	0.148	1.688	86,110	14,800	3,723	2.768	1.118	3.886

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Coiled tubing dimensions and specifications						Calculated coiled tubing performance properties					
Specified outside diameter (OD), in.	Tube body weight, lb/ft	Material yield strength, psi	Wall thickness Specified, in.	Wall thickness Minimum, in.	Inside diameter, (ID), in.	Body yield load lb	Internal yield pressure psig	Torsional yield strength lb–ft	Internal capacity bbl/1,000 ft	Body wall displacement bbl/1,000 ft	External displacement bbl/1,000 ft
2.000	3.41	100,000	0.175	0.167	1.650	96,168	16,700	4,057	2.645	1.241	3.886
2.000	3.64	100,000	0.188	0.180	1.624	102,919	18,000	4,272	2.562	1.324	3.886
2.000	3.90	100,000	0.203	0.195	1.594	110,576	19,500	4,508	2.468	1.417	3.886
2.375	2.64	70,000	0.109	0.104	2.157	51,940	6,131	2,832	4.520	0.960	5.479
2.375	3.00	70,000	0.125	0.117	2.125	58,098	6,897	3,181	4.386	1.093	5.479
2.375	3.21	70,000	0.134	0.126	2.107	62,317	7,427	3,371	4.312	1.167	5.479
2.375	3.70	70,000	0.156	0.148	2.063	72,482	8,724	3,816	4.134	1.345	5.479
2.375	4.11	70,000	0.175	0.167	2.025	81,089	9,844	4,177	3.983	1.496	5.479
2.375	4.39	70,000	0.188	0.180	1.999	86,887	10,611	4,413	3.882	1.598	5.479
2.375	4.43	70,000	0.190	0.182	1.995	87,772	10,728	4,448	3.866	1.613	5.479
2.375	4.71	70,000	0.203	0.195	1.969	93,484	11,495	4,674	3.766	1.713	5.479
2.375	2.64	80,000	0.109	0.104	2.157	59,360	7,006	3,236	4.520	0.960	5.479
2.375	3.00	80,000	0.125	0.117	2.125	66,397	7,882	3,635	4.386	1.093	5.479
2.375	3.21	80,000	0.134	0.126	2.107	71,220	8,488	3,853	4.312	1.167	5.479
2.375	3.70	80,000	0.156	0.148	2.063	82,837	9,971	4,361	4.134	1.345	5.479
2.375	4.11	80,000	0.175	0.167	2.025	92,673	11,251	4,774	3.983	1.496	5.479
2.375	4.39	80,000	0.188	0.180	1.999	99,299	12,126	5,043	3.882	1.598	5.479
2.375	4.43	80,000	0.190	0.182	1.995	100,311	12,261	5,084	3.866	1.613	5.479
2.375	4.71	80,000	0.203	0.195	1.969	106,839	13,137	5,342	3.766	1.713	5.479
2.375	3.00	90,000	0.125	0.117	2.125	74,697	8,867	4,090	4.386	1.093	5.479
2.375	3.21	90,000	0.134	0.126	2.107	80,122	9,549	4,335	4.312	1.167	5.479
2.375	3.70	90,000	0.156	0.148	2.063	93,191	11,217	4,906	4.134	1.345	5.479
2.375	4.11	90,000	0.175	0.167	2.025	104,258	12,657	5,371	3.983	1.496	5.479
2.375	4.43	90,000	0.190	0.182	1.995	112,850	13,794	5,719	3.866	1.613	5.479
2.375	4.73	90,000	0.204	0.196	1.967	120,755	14,855	6,031	3.758	1.721	5.479
2.375	2.64	100,000	0.109	0.104	2.157	74,199	8,758	4,045	4.520	0.960	5.479
2.375	3.00	100,000	0.125	0.117	2.125	82,996	9,853	4,545	4.386	1.093	5.479
2.375	3.21	100,000	0.134	0.126	2.107	89,025	10,611	4,816	4.312	1.167	5.479
2.375	3.70	100,000	0.156	0.148	2.063	103,546	12,463	5,451	4.134	1.345	5.479
2.375	4.11	100,000	0.175	0.167	2.025	115,842	14,063	5,967	3.983	1.496	5.479
2.375	4.39	100,000	0.188	0.180	1.999	124,124	15,158	6,304	3.882	1.598	5.479
2.375	4.71	100,000	0.203	0.195	1.969	133,549	16,421	6,677	3.766	1.713	5.479
2.875	3.67	70,000	0.125	0.117	2.625	70,962	5,697	4,794	6.694	1.336	8.029
2.875	3.92	70,000	0.134	0.126	2.607	76,172	6,136	5,090	6.602	1.427	8.029
2.875	4.53	70,000	0.156	0.148	2.563	88,755	7,207	5,789	6.381	1.648	8.029
2.875	5.05	70,000	0.175	0.167	2.525	99,452	8,132	6,365	6.193	1.836	8.029
2.875	5.40	70,000	0.188	0.180	2.499	106,679	8,765	6,744	6.066	1.963	8.029
2.875	5.45	70,000	0.190	0.182	2.495	107,784	8,863	6,802	6.047	1.982	8.029
2.875	5.79	70,000	0.203	0.195	2.469	114,926	9,496	7,167	5.922	2.108	8.029
2.875	3.67	80,000	0.125	0.117	2.625	81,100	6,511	5,478	6.694	1.336	8.029
2.875	3.92	80,000	0.134	0.126	2.607	87,053	7,012	5,817	6.602	1.427	8.029
2.875	4.53	80,000	0.156	0.148	2.563	101,435	8,237	6,617	6.381	1.648	8.029
2.875	5.05	80,000	0.175	0.167	2.525	113,659	9,294	7,274	6.193	1.836	8.029
2.875	5.40	80,000	0.188	0.180	2.499	121,919	10,017	7,708	6.066	1.963	8.029
2.875	5.45	80,000	0.190	0.182	2.495	123,182	10,129	7,773	6.047	1.982	8.029
2.875	5.79	80,000	0.203	0.195	2.469	131,344	10,852	8,191	5.922	2.108	8.029
2.875	3.92	90,000	0.134	0.126	2.607	97,935	7,889	6,544	6.602	1.427	8.029
2.875	4.53	90,000	0.156	0.148	2.563	114,114	9,266	7,444	6.381	1.648	8.029
2.875	5.05	90,000	0.175	0.167	2.525	127,867	10,456	8,184	6.193	1.836	8.029
2.875	5.45	90,000	0.190	0.182	2.495	138,580	11,395	8,745	6.047	1.982	8.029
2.875	5.82	90,000	0.204	0.196	2.467	148,464	12,271	9,251	5.912	2.117	8.029
2.875	6.34	90,000	0.224	0.216	2.427	162,392	13,523	9,944	5.722	2.307	8.029
2.875	3.67	100,000	0.125	0.117	2.625	101,375	8,139	6,848	6.694	1.336	8.029
2.875	3.92	100,000	0.134	0.126	2.607	108,817	8,765	7,272	6.602	1.427	8.029
2.875	4.53	100,000	0.156	0.148	2.563	126,793	10,296	8,271	6.381	1.648	8.029
2.875	5.05	100,000	0.175	0.167	2.525	142,074	11,617	9,093	6.193	1.836	8.029
2.875	5.40	100,000	0.188	0.18	2.499	152,399	12,522	9,635	6.066	1.963	8.029
2.875	5.79	100,000	0.203	0.195	2.469	164,180	13,565	10,239	5.922	2.108	8.029
3.500	4.82	70,000	0.134	0.126	3.232	93,490	5,040	7,737	10.147	1.753	11.900
3.500	5.57	70,000	0.156	0.148	3.188	109,097	5,920	8,837	9.873	2.027	11.900
3.500	6.21	70,000	0.175	0.167	3.150	122,405	6,680	9,751	9.639	2.261	11.900
3.500	6.65	70,000	0.188	0.180	3.124	131,419	7,200	10,358	9.480	2.419	11.900
3.500	6.72	70,000	0.190	0.182	3.120	132,799	7,280	10,449	9.456	2.444	11.900
3.500	7.15	70,000	0.203	0.195	3.094	141,727	7,800	11,039	9.299	2.601	11.900
3.500	7.18	70,000	0.204	0.196	3.092	142,411	7,840	11,084	9.287	2.613	11.900
3.500	7.84	70,000	0.224	0.216	3.052	155,993	8,640	11,960	9.048	2.851	11.900
3.500	4.82	80,000	0.134	0.126	3.232	106,845	5,760	8,842	10.147	1.753	11.900
3.500	5.57	80,000	0.156	0.148	3.188	124,683	6,766	10,099	9.873	2.027	11.900
3.500	6.21	80,000	0.175	0.167	3.150	139,892	7,634	11,144	9.639	2.261	11.900
3.500	6.65	80,000	0.188	0.180	3.124	150,193	8,229	11,837	9.480	2.419	11.900
3.500	6.72	80,000	0.190	0.182	3.120	151,771	8,320	11,942	9.456	2.444	11.900

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Coiled tubing dimensions and specifications						Calculated coiled tubing performance properties					
Specified outside diameter (OD), in.	Tube body weight, lb/ft	Material yield strength, psi	Wall thickness Specified, in.	Wall thickness Minimum, in.	Inside diameter, (ID), in.	Body yield load lb	Internal yield pressure psig	Torsional yield strength lb–ft	Internal capacity bbl/1,000 ft	Body wall displacement bbl/1,000 ft	External displacement bbl/1,000 ft
3.500	7.15	80,000	0.203	0.195	3.094	161,974	8,914	12,616	9.299	2.601	11.900
3.500	7.18	80,000	0.204	0.196	3.092	162,756	8,960	12,667	9.287	2.613	11.900
3.500	7.84	80,000	0.224	0.216	3.052	178,278	9,874	13,669	9.048	2.851	11.900
3.500	4.82	90,000	0.134	0.126	3.232	120,201	6,480	9,947	10.147	1.753	11.900
3.500	5.57	90,000	0.156	0.148	3.188	140,268	7,611	11,362	9.873	2.027	11.900
3.500	6.21	90,000	0.175	0.167	3.150	157,378	8,589	12,537	9.639	2.261	11.900
3.500	6.72	90,000	0.190	0.182	3.120	170,742	9,360	13,435	9.456	2.444	11.900
3.500	7.18	90,000	0.204	0.196	3.092	183,100	10,080	14,250	9.287	2.613	11.900
3.500	7.84	90,000	0.224	0.216	3.052	200,562	11,109	15,377	9.048	2.851	11.900
3.500	4.82	100,000	0.134	0.126	3.232	133,557	7,200	11,053	10.147	1.753	11.900
3.500	5.57	100,000	0.156	0.148	3.188	155,853	8,457	12,624	9.873	2.027	11.900
3.500	6.21	100,000	0.175	0.167	3.150	174,865	9,543	13,930	9.639	2.261	11.900
3.500	6.65	100,000	0.188	0.180	3.124	187,742	10,286	14,796	9.480	2.419	11.900
3.500	7.15	100,000	0.203	0.195	3.094	202,468	11,143	15,770	9.299	2.601	11.900
4.500	8.75	70,000	0.190	0.182	4.120	172,823	5,662	17,919	16.489	3.182	19.671
4.500	9.36	70,000	0.204	0.196	4.092	185,514	6,098	19,058	16.266	3.405	19.671
4.500	10.23	70,000	0.224	0.216	4.052	203,494	6,720	20,646	15.949	3.722	19.671
4.500	11.35	70,000	0.250	0.242	4.000	226,605	7,529	22,641	15.542	4.128	19.671
4.500	8.75	80,000	0.190	0.182	4.120	197,512	6,471	20,479	16.489	3.182	19.671
4.500	9.36	80,000	0.204	0.196	4.092	212,016	6,969	21,781	16.266	3.405	19.671
4.500	10.23	80,000	0.224	0.216	4.052	232,564	7,680	23,595	15.949	3.722	19.671
4.500	11.35	80,000	0.250	0.242	4.000	258,977	8,604	25,875	15.542	4.128	19.671
4.500	8.75	90,000	0.190	0.182	4.120	222,201	7,280	23,039	16.489	3.182	19.671
4.500	9.36	90,000	0.204	0.196	4.092	238,518	7,840	24,504	16.266	3.405	19.671
4.500	10.23	90,000	0.224	0.216	4.052	261,635	8,640	26,545	15.949	3.722	19.671
4.500	11.35	90,000	0.250	0.242	4.000	291,349	9,680	29,110	15.542	4.128	19.671
5.000	11.43	70,000	0.224	0.216	4.552	227,244	6,048	25,878	20.128	4.157	24.285
5.000	12.68	70,000	0.250	0.242	4.500	253,214	6,776	28,428	19.671	4.614	24.285
5.000	11.43	80,000	0.224	0.216	4.552	259,708	6,912	29,574	20.128	4.157	24.285
5.000	12.68	80,000	0.250	0.242	4.500	289,387	7,744	32,489	19.671	4.614	24.285

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Dimensional Data on Special Tubing

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HYDRIL SERIES 500 - TYPE 501 TUBING CONNECTION

Size (O.D.) & Weight (Nominal)	Pipe			Connection*					Minimum Tensile Yield						++ Minimum Make-Up Torque (All Grades)
									J-55		C-75		L-80/N-80		
	Wall Thickness	I.D. (Nom.)	Drift (API)	Pin Bored ID	Make-Up Loss	Threads Per Inch	O.D.	Tensile Efficiency •	Body Yield	String Length SF = 1.6	Body Yield	String Length SF = 1.6	Body Yield	String Length SF = 1.6	
In.-Lbs./Ft.	In.	In.	In.	In.	In.		In.	%	1000 Lbs.	Ft.	1000 Lbs.	Ft.	1000 Lbs.	Ft.	Ft.-Lbs.
2-3/8 - 4.7	.190	1.995	1.901	1.945	3.12	3.45	2.666	101	72	9600	98	13030	104	13830	1500
2-3/8 - 5.3	.218	1.939	1.845	1.889	3.12	3.45	2.696	101	81	9600	111	13090	118	13910	1500
2-3/8 - 5.95	.254	1.867	1.773	1.817	3.12	3.45	2.730	101	93	9770	127	13340	135	14180	1500
2-3/8 - 6.2	.261	1.853	1.759	1.803	3.12	3.45	2.740	101	95	9580	130	13100	139	14010	1500
2-7/8 - 6.5	.217	2.441	2.347	2.391	3.12	3.45	3.199	101	100	9600	136	13080	145	13940	2000
2-7/8 - 7.9	.276	2.323	2.229	2.273	3.12	3.45	3.265	101	124	9810	169	13370	180	14240	2000
2-7/8 - 8.7	.308	2.259	2.165	2.209	3.12	3.45	3.300	101	137	9840	186	13360	199	14300	2000
2-7/8 - 9.5	.340	2.195	2.101	2.145	3.12	3.45	3.329	92•	137	9010	186	12237	199	13090	2000
3-1/2 - 9.3	.254	2.992	2.867	2.942	3.12	3.45	3.868	101	142	9500	194	13040	207	13910	3000
3-1/2 - 10.3	.289	2.922	2.797	2.872	3.12	3.45	3.920	101	160	9700	219	13290	233	14140	3000
3-1/2 - 12.95	.375	2.750	2.625	2.700	3.12	3.45	3.983	91•	185	8930	251	12110	268	12930	3000
4 - 11.0	.262	3.476	3.351	3.426	3.12	3.45	4.383	101	169	9600	231	14230	246	13980	4000
4 - 11.6	.286	3.428	3.303	3.378	3.12	3.45	4.420	101	184	9910	250	13470	267	14390	4000
4 - 13.4	.330	3.340	3.215	3.290	3.12	3.45	4.489	101	209	9750	285	13290	304	14180	4000
4-1/2 - 12.75	.271	3.958	3.833	3.908	3.12	3.45	4.905	101	198	9700	270	13240	288	14120	4500
4-1/2 - 13.5	.290	3.920	3.975	3.870	3.12	3.45	4.935	101	211	9800	288	13330	307	14210	4500
4-1/2 - 15.5	.337	3.826	3.701	3.776	3.12	3.45	5.008	101	242	9760	331	13350	353	14240	4500
4-1/2 - 19.2	.430	3.640	3.515	3.590	3.12	3.45	5.043	87•	263	8560	358	11650	383	12470	4500

] Bracketed items are interchangeable

* Type 501 and 561 pins are interchangeable and both can make-up into Type 563 and 565 couplings.

• Critical Member: The critical member is the box on those integral connections whose tensile ratings are below 100%.

++ Many factors influence torque application. To ensure that minimum torque is obtained, we recommend using a figure of 15% over minimum. Make-up torque should never exceed 50% over minimum.

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HYDRIL SERIES 500 - TYPE 561 & 561- CB* TUBING CONNECTION

Size (O.D.) & Weight (Nominal)	PIPE			CONNECTION *							MINIMUM TENSILE YIELD + (CONNECTION)						++ Minimum Make-Up Torque (All Grades)
				Coupling							J-55		L-80/N-80		P-105		
	Wall Thick-ness	I.D. (Nom.)	Drift (API)	Pin Bored ID	Std O.D.	Special Clearance O.D.	Length	Make-Up Loss	Threads Per Inch	Critical Section Area •	Min. Yield	String Length SF = 1.6	Min. Yield	String Length SF = 1.6	Min. Yield	String Length SF = 1.6	
In.-Lbs./Ft.	In.	In.	In.	In.	In.	In.	In.	In.		Sq. In.	1000 Lbs.	Ft.	1000 Lbs.	Ft.	1000 Lbs.	Ft.	Ft.-Lbs.
2-3/8 - 4.6]	.190	1.995	1.901	1.945	2.875	2.679	7.000	3.12	3.45	1.145	63	8380	92	12230	120	15960	1500
2-3/8 - 5.1	.218	1.939	1.845	1.889	2.875	2.696	7.000	3.12	3.45	1.318	72	8490	105	12380	138	16270	1500
2-3/8 - 5.8	.254	1.867	1.773	1.817	2.875	2.750	7.000	3.12	3.45	1.534	84	8820	123	12920	161	16910	1500
2-3/8 - 5.95]	.261	1.853	1.759	1.803	2.875	2.760	7.000	3.12	3.45	1.574	87	8770	126	12700	165	16630	1500
2-7/8 - 6.4]	.217	2.441	2.347	2.391	3.500	3.172	7.000	3.12	3.45	1.619	89	8560	130	12500	170	16350	2000
2-7/8 - 7.7	.276	2.323	2.229	2.273	3.500	3.264	7.000	3.12	3.45	2.061	113	8940	165	13050	216	17090	2000
2-7/8 - 8.6	.308	2.259	2.165	2.209	3.500	3.311	7.000	3.12	3.45	2.291	126	9050	183	13150	241	17310	2000
2-7/8 - 9.35]	.340	2.195	2.101	2.145	3.500	3.356	7.000	3.12	3.45	2.515	138	9080	201	13220	264	17370	2000
3-1/2 - 9.2]	.254	2.992	2.867	2.942	4.250	3.867	7.000	3.12	3.45	2.361	130	8740	189	12700	248	16670	3000
3-1/2 - 10.2	.289	2.922	2.797	2.872	4.250	3.923	7.000	3.12	3.45	2.686	148	8980	215	13050	282	17110	3000
3-1/2 - 12.7]	.375	2.750	2.625	2.700	4.250	4.051	7.000	3.12	3.45	3.452	190	9170	276	13320	362	17470	3000
4 - 10.8]	.262	3.476	3.351	3.426	4.750	4.385	7.000	3.12	3.45	2.814	155	8810	225	12780	295	16760	4000
4 - 11.6	.286	3.428	3.303	3.378	4.750	4.425	7.000	3.12	3.45	3.075	169	9110	246	13250	323	17400	4000
4 - 13.2]	.330	3.340	3.215	3.290	4.750	4.495	7.000	3.12	3.45	3.542	195	9100	283	13200	372	17350	4000
4-1/2 - 12.6]	.271	3.958	3.833	3.908	5.200	4.906	7.000	3.12	3.45	3.305	182	8920	264	12940	347	17010	4500
4-1/2 - 13.35	.290	3.920	3.795	3.870	5.200	4.938	7.000	3.12	3.45	3.540	195	9030	283	13100	372	17220	4500
4-1/2 - 15.25	.337	3.826	3.701	3.776	5.200	5.015	7.000	3.12	3.45	4.112	226	9110	329	13270	432	17420	4500
4-1/2 - 18.90	.430	3.640	3.515	3.590	5.200	5.158	7.000	3.12	3.45	5.203	286	9310	416	13540	546	17770	4500

] Bracketed items are interchangeable
Type 561 and 501 pins are interchangeable and both can make-up into Type 563 and 565 couplings.

• Critical Member: The critical member in all the coupled tubing types is the pin.

+ If rated in accordance with standard industry convention, tensile ratings would be based on pipe cross sectional area which is 6-12% larger.

++ Many factors influence torque application. To ensure that minimum torque is obtained, we recommend using a figure of 15% over minimum. To prevent back-off of mill ends during break out, we suggest that field ends be made up with torques no higher than 25% over minimum and mill ends at a greater value. Make-up torque should never exceed 50% over minimum.

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HYDRIL SERIES 500 - TYPE 563 & 565 TUBING CONNECTION

Size (O.D.) & Weight (Nominal)	PIPE				CONNECTION*						MINIMUM TENSILE CAPACITY + (Connection)						++ Minimum Make-Up Torque (All Grades)
					Coupling						J-55		L-80/N-80		P-105		
	Wall Thick-ness	I.D. (Nom.)	Drift (API)	Pin I.D. (Bored)	Std. O.D.	Special Clearance O.D.	Length	Make-Up Loss	Threads Per Inch	Critical Section Area •	Min. Yield	String Length SF = 1.6	Min. Yield	String Length SF = 1.6	Min. Yield	String Length SF = 1.6	
In. - Lbs./Ft.	In.	In.	In.	In.	In.	In.	In.	In.		Sq. In.	1000 Lbs.	Ft.	1000 Lbs.	Ft.	1000 Lbs.	Ft.	Ft.-Lbs.
2-3/8 - 4.6]	.190	1.995	1.901	1.945	2.875	2.679	7.750	3.52	3.45	1.145	63	8380	92	12230	120	15960	2000
2-3/8 - 5.1	.218	1.939	1.845	1.889	2.875	2.696	7.750	3.52	3.45	1.318	72	8490	105	12380	138	16270	2000
2-3/8 - 5.8	.254	1.867	1.773	1.817	2.875	2.750	7.750	3.52	3.45	1.534	84	8820	123	12920	161	16910	2000
2-3/8 - 5.95]	.261	1.853	1.759	1.803	2.875	2.760	7.750	3.52	3.45	1.574	87	8770	126	12700	165	16630	2000
2-7/8 - 6.4]	.217	2.441	2.347	2.391	3.500	3.172	7.750	3.52	3.45	1.619	89	8560	130	12500	170	16350	3000
2-7/8 - 7.7	.276	2.323	2.229	2.273	3.500	3.264	7.750	3.52	3.45	2.061	113	8940	165	13050	216	17090	3000
2-7/8 - 8.6	.308	2.259	2.165	2.209	3.500	3.311	7.750	3.52	3.45	2.291	126	9050	183	13150	241	17310	3000
2-7/8 - 9.35]	.340	2.195	2.101	2.145	3.500	3.356	7.750	3.52	3.45	2.515	138	9080	201	13220	264	17370	3000
3-1/2 - 9.2]	.254	2.992	2.867	2.942	4.250	3.867	7.750	3.52	3.45	2.361	130	8740	189	12700	248	16670	4000
3-1/2 - 10.2	.289	2.922	2.797	2.872	4.250	3.923	7.750	3.52	3.45	2.686	148	8980	215	13050	282	17110	4000
3-1/2 - 12.7]	.375	2.750	2.625	2.700	4.250	4.051	7.750	3.52	3.45	3.452	190	9170	276	13320	362	17470	4000
4 - 10.8]	.262	3.476	3.351	3.426	4.750	4.385	7.750	3.52	3.45	2.814	155	8810	225	12780	295	16760	5000
4 - 11.6	.286	3.428	3.303	3.378	4.750	4.225	7.750	3.52	3.45	3.075	169	9110	246	13250	323	17400	5000
4 - 13.2]	.330	3.340	3.215	3.290	4.750	4.495	7.750	3.52	3.45	3.542	195	9100	283	13200	372	17350	5000
4-1/2 - 12.6]	.271	3.958	3.833	3.908	5.200	4.906	7.750	3.52	3.45	3.305	182	8920	264	12940	347	17010	6000
4-1/2 - 13.35	.290	3.920	3.795	3.870	5.200	4.938	7.750	3.52	3.45	3.540	195	9030	283	13100	372	17220	6000
4-1/2 - 15.25	.337	3.826	3.701	3.776	5.200	5.015	7.750	3.52	3.45	4.112	226	9110	329	13270	432	17420	6000
4-1/2 - 18.90]	.430	3.640	3.515	3.590	5.200	5.158	7.750	3.52	3.45	5.203	286	9310	416	13540	546	17770	6000

] Bracketed items are interchangeable.
Type 561 and 501 pins are interchangeable and both can make-up into Type 563 and 565 couplings.

• Critical Member: The critical member in all the coupled tubing types is the pin.

+ If rated in accordance with standard industry convention, tensile ratings would be based on pipe cross sectional area which is 6-12% larger.

++ Many factors influence torque application. To ensure that minimum torque is obtained, we recommend using a figure using a figure of 15% over minimum. To prevent back-off of mill ends during break out, we suggest that field ends be made up with torques no higher than 25% over minimum and mill ends at a greater value. Make-up torque should never exceed 50% over minimum.

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HYDRIL "CS" TUBING CONNECTION

Size (OD) and Weight (Nominal)	Tubing			Connection						Minimum Tension Yield (Pipe) + (Connection stronger than pipe)							
						OD				J-55		C-75		N-80/L-80		P-105	
	Wall Thick.	I.D. (Nom.)	Drift Diam.	Pin Length	Thread Pitch	Std.	Special Under-size	ID	Effi-ciency	1000 Lbs.	Setting Depth SF = 1.6	1000 Lbs.	Setting Depth SF = 1.6	1000 Lbs.	Setting Depth SF = 1.6	1000 Lbs.	Setting Depth SF = 1.6
Inches/ Lbs.	Inches	Inches	Inches	Inches	No./In.	Inches	Inches	Inches	Percent								
3/4 (1.050-OD) / 1.2	.113	.824	.672	2.187	8	1.327	1.300	.687	139	18	9400	25	13020	27	14060	35	18230
3/4 (1.050-OD) / 1.5	.154	.742	.648	2.187	8	1.327	-	.687	107	24	10000	33	13750	35	14580	46	19170
1 (1.315-OD) / 1.8	.133	1.049	.955	2.187	8	1.552	1.525	.970	114	27	9400	37	12850	40	13890	52	18060
1 (1.315-OD) / 2.25	.179	.957	.848	2.187	8	1.600	-	.864	103	35	9700	48	13330	51	14170	67	18610
1-1/4 (1.660-OD) / 2.4	.140	1.380	1.286	2.187	8	1.883	1.858	1.300	110	37	9600	50	13020	53	13800	70	18230
1-1/4 (1.660-OD) / 3.02	.191	1.278	1.184	2.187	8	1.927	-	1.218	102	48	9900	66	13660	71	14690	93	19250
1-1/4 (1.660-OD) / 3.24	.198	1.264	1.170	2.187	8	1.927	-	1.200	103	50	9600	68	13120	73	14080	95	18330
1-1/2 (1.9000-OD) / 2.9	.145	1.610	1.516	2.187	8	2.113	2.094	1.530	107	44	9500	60	12930	64	13790	84	18100
1-1/2 (1.9000-OD) / 3.64	.200	1.500	1.406	2.187	8	2.162	-	1.440	100	59	10100	80	13740	85	14590	112	19230
1-1/2 (1.9000-OD) / 4.19	.219	1.462	1.368	2.187	8	2.179	-	1.390	102	64	9500	87	12980	93	13870	121	18050
2-1/16 / 3.25	.156	1.751	1.657	2.187	8	2.330	2.300	1.700	108	51	9800	70	13460	75	14420	98	18850
2-1/16 / 4.5	.225	1.613	1.519	2.187	8	2.460	-	1.550	102	71	9900	97	13470	104	14440	136	18890
2-3/8 / 4.7	.190	1.995	1.901	2.272	8	2.700	2.630	1.945	106	72	9600	98	13030	104	13830	137	18220
2-3/8 / 5.3	.218	1.939	1.845	2.260	8	2.740	-	1.890	104	81	9600	111	13070	118	13910	155	18280
2-7/8 / 6.5	.217	2.441	2.347	2.338	8	3.220	3.155	2.375	101	100	9600	136	13080	145	13940	190	18270
3-1/2 / 9.3	.254	2.992	2.867	2.788	8	3.905	3.805	2.920	105	142	9500	194	13040	207	13910	272	18280
3-1/2 / 10.3	.289	2.922	2.797	2.786	8	3.955	-	2.878	100	160	9700	219	13290	233	14140	306	18570

+ Pipe tension strength calculated on: J-55 = 55,000 yield. C-75 = 75,000 yield. L-80/N-80 = 80,000 yield. P-105 = 105,000 yield.
Hydril CS, CS-CB, A-95 and A-95-CB threads are interchangeable.

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HYDRIL PH-6 CONNECTION

Size (O.D.) & Weight (Nom.) Inches Lbs.	Tubing			Connection						Minimum Tension Yield (Pipe) + (Connection stronger than pipe)					
										C-75		N-80/L-80		P-105	
	Wall Thick. Inches	I.D. (Nom.) Inches	Drift Diam. Inches	Pin Length Inches	Thread Pitch No./In.	O.D. Turned Inches	Special Clear-ance O.D. Inches	I.D. Bored Inches	Efficiency Per-Cent	1000 Lbs.	Setting Depth SF = 1.6	1000 Lbs.	Setting Depth SF = 1.6	1000 Lbs.	Setting Depth SF = 1.6
2-3/8 / 5.95	.254	1.867	1.773	2.978	6	2.906	2.782	1.805	109	127	13340	135	14180	178	18700
2-3/8 / 6.2	.261	1.853	1.759	2.969	6	2.938	2.794	1.795	108	130	13100	139	14010	182	18350
2-3/8 / 7.7	.336	1.703	1.609	2.936	6	3.125	3.002	1.645	106	161	13070	172	13960	226	18340
2-7/8 / 7.9	.276	2.323	2.229	2.951	6	3.438	3.312	2.265	108	169	13370	180	14240	237	18750
2-7/8 / 8.7	.308	2.259	2.165	2.942	6	3.500	3.365	2.200	107	186	13360	199	14300	261	18750
2-7/8 / 9.5	.340	2.195	2.101	2.918	6	3.625	3.419	2.130	107	203	13350	217	14280	284	18680
2-7/8 / 10.7	.392	2.091	1.997	2.918	6	3.688	3.595	2.030	105	229	13380	245	14310	321	18750
3-1/2 / 12.95	.375	2.750	2.625	3.236	6	4.313	4.189	2.687	119	276	13310	295	14240	387	18680
3-1/2 / 15.8	.476	2.548	2.423	3.226	6	4.500	4.474	2.485	106	339	13410	362	14320	475	18790

+ Tension strength calculated on: C-75 = 75,000 yield. N-80 / L-80 = 80,000 yield. P-105 = 105,000 yield.
All Hydril PH-6 tubing connections of any given size are interchangeable.

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HYDRIL PH-4 CONNECTION

Size (O.D.) & Weight (Nominal)	TUBING			CONNECTION					MINIMUM TENSION YIELD (PIPE) + (Connection stronger than pipe)					
	Wall Thick.	I.D. (Nom.)	Drift Diam.	Pin Length	Thread Pitch	O.D. Turned	I.D. Bored	Efficiency	C-75		L-80/N-80		P-105	
Inches Lbs.	Inches	Inches	Inches	Inches	No./In.	Inches	Inches	Per-Cent	1000 Lbs	Length Of String	1000 Lbs	Length Of String	1000 Lbs.	Length Of String
2-7/8 - 11.0	.405	2.065	1.971	4.125	4	3.750	2.000	106	236	13400	251	14300	330	18800
2-7/8 - 11.65	.440	1.995	1.901	4.125	4	3.750	1.945	104	252	13200	269	14100	353	18500
3-1/2 - 16.7	.510	2.480	2.355	4.125	4	4.500	2.406	105	359	13400	383	14300	503	18800
3-1/2 - 17.05	.530	2.440	2.315	4.110	4	4.563	2.375	104	371	13600	396	14500	519	19000
4 - 19	.500	3.000	2.875	4.625	4	5.000	2.920	106	412	13600	440	14500	577	19000
4 - 22.5	.610	2.780	2.655	4.602	4	5.188	2.700	105	487	13500	520	14400	682	18900
4-1/2 - 21.6	.500	3.500	3.375	4.630	4	5.500	3.420	106	331	13300	353	14200	463	19100
4-1/2 - 24.0	.560	3.380	3.255	4.625	4	5.563	3.300	105	520	13500	555	14500	728	19000
4-1/2 - 26.5	.630	3.240	3.115	4.620	4	5.688	3.160	105	574	13500	613	14500	804	19000

+Tension strength calculated on: J-55 = 55,000 yield. C-75 = 75,000 yield. L-80/N-80 = 80,000 yield. P-105 = 105,000 yield.
All Hydril PH-4 tubing connections of any given size are interchangeable.

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HYDRIL CF J-P CONNECTION

Size (O.D.) & Weight (Nominal)	TUBING			CONNECTION					HYDRIL CFJ-P TENSION							
									J-55		C-75		N-80/L-80		P-105	
	Wall Thick.	I.D. (Nom.)	Drift Diam.	Pin Length	Thread Pitch	O.D. (Turned)	I.D. (Bored)	Critical Section Area •	Min. Yld.	Setting Depth SF = 1.6	Min. Yld.	Setting Depth SF = 1.6	Min. Yld.	Setting Depth SF = 1.6	Min. Yld.	Setting Depth SF = 1.6
Ins. Lbs.	Inches	Inches	Inches	Inches	No./In.	Inches	Inches	Sq. In.								
2-3/8 - 4.7	.190	1.995	1.901	2.125	8	2.525	1.945	0.849M	47	6250	64	8510	68	9040	89	11800
2-3/8 - 5.3	.218	1.939	1.845	2.125	8	2.525	1.890	1.016M	56	6600	75	8960	81	9550	107	12600
2-7/8 - 6.5	.217	2.441	2.347	2.094	8	3.000	2.375	1.192F	66	6400	89	8600	95	10600	125	12000
3-1/2 - 9.3	.254	2.992	2.867	2.656	8	3.609	2.920	1.740M	96	6500	131	8800	139	9300	183	17600
3-1/2 - 10.3	.289	2.922	2.797	2.656	8	3.609	2.878	1.911F	105	6400	143	8700	153	9300	201	12200
4 - 11	.262	3.476	3.351	2.594	8	4.100	3.395	2.060M	113	6400	155	8000	165	9400	216	12300
4-1/2 - 12.75	.271	3.958	3.833	2.625	8	4.609	3.865	2.564M	141	6900	192	9400	205	10000	269	13200
5 - 23.2	.478	4.044	3.919	3.125	6	5.100	3.960	4.427F	243	6600	332	8900	354	9500	487	13100

• Critical Member: M = Male and F = Female.
+ Tension strengths calculated on J-55 = 55,000 yield. C-75 - 75,000 yield. L-80/N-80 = 80,000 yield. P-105 = 105,000 yield.
All Hydril CFJ-P tubing connections of any given size are interchangeable.

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HYDRIL A-95 CONNECTION

Size (O.D.) & Weight (Nominal)	TUBING		CONNECTION							MINIMUM TENSION YIELD + (Connection)					
					O.D.					J-55		L-80/N-80		P-105	
	Wall Thick.	I.D. (Nom.)	Pin Length	Thread Pitch	STANDARD (Mill Upset Min.	STANDARD (Mill Upset Max.	Special Hydril Machined	I.D. Pin (Bored)	Critical Section Area •	Min. Yield	Length of String SF = 1-1/2	Min. Yield	Length of String SF = 1-1/2	Min. Yield	Length of String SF = 1-1/2
Inches Lbs.	Inches	Inches	Inches	No./In.	Inches	Inches	Inches	Inches	Sq. Inches						
1-1/4 - 2.4	.140	1.380	2.197	8	1.858	1.898	1.858	1.300	0.578M	32	8,890	46	12,780	61	16900
1-1/2 - 2.9	.145	1.610	2.197	8	2.094	2.134	2.094	1.530	0.667M	37	8,510	53	12,180	70	16100
2-1/16 - 3.25	.156	1.751	2.204	8	2.285	2.325	2.300	1.700	0.886M	49	10,050	71	14,560	93	19100
2-3/8 - 4.7	.190	1.995	2.276	8	2.610	2.700	2.630	1.945	1.228F	68	9,650	98	13,900	129	18300
2-7/8 - 6.5	.217	2.441	2.348	8	3.130	3.220	3.155	2.375	1.597M	88	9,030	128	13,130	168	17200
3-1/2 - 9.3	.254	2.992	2.797	8	3.780	3.905	3.805	2.920	2.421M	133	9,530	194	13,910	254	18200
4 - 11.0	.262	3.476	2.794	8	4.290	4.405	4.315	3.395	2.827M	155	9,390	226	13,700	297	18000
4-1/2 - 12.75	.271	3.958	2.843	8	4.790	4.910	4.825	3.865	3.256M	179	9,360	260	13,590	342	19100

+ Tension strength calculated on - J-55 = 55,000 yield or L-80/N-80 = 80,000 yield.
Hydril A-95, A95-CB, and CS-CB threads are interchangeable.
• Critical Member: M = Male and F = Female.

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PITTSBURGH 8-ACME THREAD NON-UPSET TUBING
PERFORMANCE PROPERTIES

		COLLAPSING PRESSURE		TENSION[2] REGULAR AND SPEC. CLEARANCE COUPLINGS		INTERNAL PRESSURE		
Size O.D. Ins.	Wt. Per Ft. T & C Lbs.	Min. Pressure PSI	Equiv.[3] Length S.F. 1-1/8 Ft.	Min. Yield Load Lbs.	Equiv. Length S.F. 2 Ft.	At Min. Yield & Min. Wall PSI	Alternate[1] Test Pressure PSI	Mill Test Pressure PSI
J-55 Grade								
1.900	3.10	7700	13690	49470	7980	8360	7650	3000
2	3.40	7380	13120	52320	7690	7940	7300	3000
2-3/8	4.60	7180	12760	71730	7800	7700	7000	3000
2-7/8	6.40	6800	12090	99660	7790	7260	6600	3000
3-1/2	9.20	6560	11660	142460	7740	6980	6400	3000
4	10.90	5750	10220	169220	7760	6300	5800	3000
4-1/2	12.60	5110	9080	198030	7860	5800	5300	3000
N-80 Grade								
1.900	3.10	10070	17900	71950	11600	12160	11120	10000
2	3.40	9650	17160	76100	11190	11550	10600	10000
2-3/8	4.60	9380	16680	104340	11340	11200	10200	10000
2-7/8	6.40	8900	15820	144960	11330	10570	9700	9700
3-1/2	9.20	8580	15250	207220	11260	10160	9300	9300
4	10.90	7520	13370	246140	11290	9170	8400	8400
4-1/2	12.60	6680	11880	288040	11430	8440	7700	7700
P-105 Grade								
2	3.40	13060	23220	99880	14690	15160	13900	10000
2-3/8	4.60	12700	22580	136940	14880	14700	13400	10000
2-7/8	6.40	12040	21400	190260	14860	13870	12700	10000
3-1/2	9.20	11610	20640	271970	14780	13340	12200	10000
4	10.90	10180	18100	323090	14820	12400	11000	10000
4-1/2	12.60	9060	16110	378050	15000	11080	10100	10000

1. Alternate test pressure at 80% of minimum yield and nominal wall.
2. Yield loads based on yield strength of body of tubing. Equivalent length based on nominal weight per foot. Tension properties for turned-down couplings of the next higher grade are the same as for regular couplings of the same grade.
3. Setting depths and safety factors are given as a matter of information only and are based on setting depth in salt water at pressure of 0.5 pounds per foot depth.

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PITTSBURGH SEAMLESS 8-ACME THREAD NON-UPSET OWT
TUBE AND COUPLING DIMENSIONS

TUBING						COUPLING							
	WT. PER FT.					OUTSIDE DIAM.		Length:	CALC. WT.		CROSS-SECTIONAL AREA		
Size O.D.	Nom. T & C	Plain End	Wall	Inside Diam.	Drift Diam.	Reg.	Spec. Clear.	Regular, Spec. Clear.	Reg.	Spec. Clear.	Plain End Tubing	Cplg. Reg.	Cplg. Spec. Clear.
Ins.	Lbs.	Lbs.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Lbs.	Lbs.	Sq. Ins.	Sq. Ins.	Sq. Ins.
1.900	3.10	3.02	.165	1.570	1.476	2.400	2.200	7-3/4	4.10	2.53	0.899	1.963	1.240
2	3.40	3.23	.165	1.670	1.576	2.500	2.300	7-3/4	4.30	2.66	0.951	2.056	1.302
2-3/8	4.60	4.43	.190	1.995	1.901	2.875	2.700	8-1/2	5.61	3.79	1.304	2.491	1.725
2-7/8	6.40	6.16	.217	2.441	2.347	3.500	3.220	8-1/2	8.31	4.79	1.812	3.651	2.174
3-1/2	9.20	8.81	.254	2.992	2.867	4.250	3.865	8-1/2	11.92	6.08	2.590	5.203	2.749
4	10.90	10.46	.262	3.476	3.351	4.750	4.400	8-1/2	13.48	7.49	3.077	5.885	3.369
4-1/'2	12.60	12.24	.271	3.958	3.833	5.200	4.920	8-1/2	14.06	8.76	3.600	6.156	3.931

1. Cross-sectional area of couplings calculated at plane of first engaged thread in a power-tight position.
2. Smaller, larger, or intermediate sizes to those listed here are available on an inquiry basis.

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PITTSBURGH SPECIAL ACME-THREAD OIL WELL TUBING
EXTERNAL UPSET

Nominal Size	Weight Per Foot		GRADE J-55					GRADE N-80					Intenal Test Pressure Per Sq/ In.			Diameters		Drift Diameter	Wall Thickness	D/t Ratio	Upset		Coupling	
			Collapsing Pressures		Minimum Strength of Joint			Collapsing Pressures		Minimum Strength of Joint														
	Nominal Threads and Couplings	Plain Ends	Minimum PSI	Equiv. Length S.F. 1-1/8	1000 Pounds	Equiv. Length S.F.1	Internal Pressure at Min. Yield Strength PSI	Minimum PSI	Equiv. Length S.F. 1-1/8	1000 Pounds	Equiv. Length S.F. 1	Internal Pressure at Min. Yield Strength PSI	H-40	J-55	N-80	Outside	Inside				Diameter	Length	Outside Diameter	Length
Ins.	Lbs.	Lbs.	Lbs.	Ft		Ft.	Lbs.	Lbs.	Ft.		Ft.	Lbs.	Lbs.	Lbs.	Lbs.	Ins.	Ins.	Ins.	Ins.		Ins.	Ins.	Ins.	Ins.
			+					+																
1.660	2.40	2.27	7530	13390	53.4	22280	8120	9850	17510	60.2	25070	11800	3000	3000	10000	1.660	1.380	1.286	.140	11.86	1.891	2-3/8	2.200	4.250
1.900	2.90	2.72	6870	12210	64.	22050	7350	8980	15960	72.	24810	10680	3000	3000	9800	1.900	1.610	1.516	.145	13.10	2.176	2-1/2	2.500	4.375
2-3/8	4.70	4.43	7180	12760	104.	22200	7700	9380	16680	117.	24970	11200	3000	3000	10000	2.375	1.995	1.901	.190	12.50	2.680	3-1.2	3.063	5.500
2-7/8	6.50	6.16	6800	12090	145.	22300	7260	8900	15820	163.	25090	10570	3000	3000	9700	2.875	2.441	2.347	.217	13.25	3.180	3-3/4	3.668	6.000
3-1/2	9.30	8.81	6560	11660	207.	22280	6980	8580	15250	223.	25070	10160	3000	3000	9300	3.500	2.992	2.867	.254	13.78	3.837	4	4.500	6.625
4	11.00	10.46	5750	10220	246.	22380	6300	7520	13370	277.	25170	9170	3000	3000	8400	4.000	3.476	3.351	.262	15.27	4.337	4	5.000	6.875
4-1/2	12.75	12.24	5110	9080	288.	22590	5790	6680	11880	324.	25410	8440	3000	3000	7700	4.500	3.958	3.833	.271	16.61	4.837	4-1/4	5.563	7.125

+ We do not recommend any factors of safety nor guarantee setting depths. Such data given here as a matter of information only. Setting depth properties for collapse are based on new minimum values (75% of old averages): S.F. 1-1/8 here corresponds to S.F. 1-1/2 on old average collapse pressures and is based on setting depth in salt water at pressure of .5 lb. per foot depth. Setting depth properties for tension load are based on minimum yield strength of body of pipe, S.F. 1; operators may figure own safety factors from this.

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Make Up Torque Guide

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External Upset
Recommended Make-Up Torque

OD (in.)	OD (mm)	Weight (lb/ft)	Grade	Torque (ft - lb) (kg - m) Minimum		Optimum		Maximum	
1.050	26.7	1.20	H-40	350	50	460	65	580	80
			J-55	450	60	600	85	750	105
			C-75	590	80	780	110	980	135
			N-80	620	85	830	115	1040	145
1.315	33.4	1.80	H-40	330	45	440	60	550	75
			J-55	430	60	570	80	710	100
			C-75	560	75	740	100	930	130
			N-80	590	80	790	110	990	135
1.660	42.2	2.40	H-40	400	55	530	75	660	90
			J-55	520	70	690	95	860	120
			C-75	680	95	910	125	1140	160
			N-80	720	100	960	135	1200	165
1.900	48.3	2.90	H-40	500	70	670	95	840	115
			J-55	660	90	880	120	1100	150
			C-75	860	120	1150	160	1440	200
			N-80	920	125	1220	170	1530	210
2.375	60.3	4.70	H-40	740	100	990	135	1240	170
			J-55	970	135	1290	180	1610	225
			C-75	1280	175	1700	235	2130	295
			N-80	1350	185	1800	250	2250	310
			P-105	1700	235	2270	315	2840	395
		5.95	C-75	1590	220	2120	295	2650	365
			N-80	1680	230	2240	310	2800	385
			P-105	2120	295	2830	390	3540	490
2.875	73.0	6.50	H-40	940	130	1250	175	1560	215
			J-55	1240	170	1650	230	2060	285
			C-75	1630	225	2170	300	2710	375
			N-80	1730	240	2300	320	2880	400
			P-105	2180	300	2910	400	3640	505
		8.70	C-75	2140	295	2850	395	3560	490
			N-80	2270	315	3020	420	3780	525
			P-105	2860	395	3810	525	4760	660
3.500	88.9	9.30	H-40	1300	180	1730	240	2160	300
			J-55	1710	235	2280	315	2850	395
			C-75	2260	315	3010	415	3760	520
			N-80	2400	330	3200	445	4000	555
			P-105	3040	420	4050	560	5060	700
		12.95	C-75	3030	420	4040	560	5050	700
			N-80	3220	445	4290	595	5360	740
			P-105	4070	565	5430	750	6790	940
4.000	101.6	11.00	H-40	1460	200	1940	270	2430	335
			J-55	1920	265	2560	355	3200	445
			C-75	2540	350	3390	470	4240	585
			N-80	3420	475	4560	630	5700	790
4.500	114.3	12.75	H-40	1620	225	2160	300	2700	375
			J-55	2150	295	2860	395	3180	440
			C-75	2840	395	3780	525	4730	655
			N-80	3020	420	4020	555	5030	695

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TUBING MAKE-UP TORQUE GUIDE
NON-UPSET
RECOMMENDED MAKE-UP TORQUE

O.D. (in.)	O.D. (mm)	Weight (lb/ft)	Grade	Torque (ft - lb) (kg - m) Minimum		Optimum		Maximum	
1.050	**26.7**	1.14	H-40	110	**15**	140	**20**	180	**25**
			J-55	140	**20**	180	**25**	230	**32**
			C-75	170	**24**	230	**32**	290	**40**
			N-80	190	**26**	250	**35**	310	**43**
1.315	**33.4**	1.70	H-40	160	**22**	210	**29**	260	**36**
			J-55	200	**28**	270	**37**	340	**47**
			C-75	270	**37**	360	**50**	450	**62**
			N-80	290	**40**	380	**53**	480	**66**
1.660	**42.2**	2.30	H-40	200	**28**	270	**37**	340	**47**
			J-55	260	**36**	350	**48**	440	**61**
			C-75	350	**48**	460	**64**	580	**80**
			N-80	370	**51**	490	**68**	610	**84**
1.900	**48.3**	2.75	H-40	240	**33**	320	**44**	400	**55**
			J-55	310	**43**	410	**57**	500	**69**
			C-75	410	**57**	540	**75**	680	**94**
			N-80	430	**59**	570	**79**	700	**97**
2.375	**60.3**	4.00	H-40	350	**50**	470	**65**	590	**80**
			J-55	460	**65**	610	**85**	760	**105**
			C-75	600	**85**	800	**110**	1000	**140**
			N-80	640	**90**	850	**120**	1060	**145**
		4.60	H-40	420	**60**	560	**75**	700	**95**
			J-55	550	**75**	730	**100**	910	**125**
			C-75	720	**100**	960	**135**	1200	**165**
			N-80	770	**105**	1020	**140**	1280	**175**
			P-105	960	**135**	1280	**175**	1600	**220**
		5.80	C-75	1040	**145**	1380	**190**	1730	**240**
			N-80	1100	**150**	1460	**200**	1830	**255**
			P-105	1380	**190**	1840	**255**	2300	**320**
2.875	**73.0**	6.40	H-40	600	**85**	800	**110**	1000	**140**
			J-55	790	**110**	1050	**145**	1310	**180**
			C-75	1040	**145**	1380	**190**	1730	**240**
			N-80	1100	**150**	1470	**205**	1840	**255**
			P-105	1390	**190**	1850	**255**	2310	**320**
		8.60	C-75	1570	**215**	2090	**290**	2600	**360**
			N-80	1660	**230**	2210	**305**	2760	**380**
			P-105	2090	**290**	2790	**385**	3490	**485**

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NON-UPSET
RECOMMENDED MAKE-UP TORQUE

OD (in.)	OD (mm)	Weight (lb/ft)	Grade	Torque (ft - lb) (kg - m) Minimum		Optimum		Maximum	
3.500	88.9	7.70	H-40	690	95	920	125	1150	160
			J-55	910	125	1210	165	1510	210
			C-75	1200	165	1600	220	2000	275
			N-80	1280	175	1700	235	2130	295
		9.20	H-40	840	115	1120	155	1400	195
			J-55	1110	155	1480	205	1850	255
			C-75	1460	200	1950	270	2440	335
			N-80	1550	215	2070	285	2590	360
			P-105	1970	270	2620	360	3280	455
		10.20	H-40	980	135	1310	180	1640	225
			J-55	1290	180	1720	240	2150	295
			C-75	1700	235	2270	315	2840	395
			N-80	1810	250	2410	335	3010	415
		12.70	C-75	2270	315	3030	420	3790	525
			N-80	2410	335	3210	445	4010	555
			P-105	3050	420	4060	560	5080	700
4.000	101.6	9.50	H-40	710	100	940	130	1180	165
			J-55	930	130	1240	170	1550	215
			C-75	1230	170	1640	225	2050	285
			N-80	1310	180	1740	240	2180	300
4.500	114.3	12.60	H-40	990	135	1320	185	1650	230
			J-55	1310	180	1740	240	2180	300
			C-75	1730	240	2300	320	2880	400
			N-80	1830	255	2440	335	3050	420

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INTEGRAL JOINT
RECOMMENDED MAKE-UP TORQUE

OD (in.)	OD (mm)	Weight (lb/ft)	Grade	Torque (ft - lb) (kg - m) Minimum		Optimum		Maximum	
1.315	33.4	1.72	H-40	230	30	310	45	390	55
			J-55	300	40	400	55	500	70
			C-75	390	55	520	70	650	90
			N-80	410	55	550	75	690	95
1.660	42.2	2.10 & 2.33	H-40	280	40	380	55	480	65
			J-55	380	55	500	70	630	85
		2.33	C-75	490	70	650	90	810	110
			N-80	520	70	690	95	860	120
1.900	48.3	2.40 & 2.76	H-40	340	45	450	69	560	75
			J-55	440	60	580	80	730	100
		2.76	C-75	570	80	760	105	950	130
			N-80	610	85	810	110	1010	140
2.063	52.4	3.25	H-40	430	60	570	80	710	100
			J-55	560	75	740	100	920	125
			C-75	730	100	970	135	1210	165
			N-80	770	910	1030	142	1290	180

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HYDRIL PH-6
RECOMMENDED MAKE-UP TORQUE

OD		Weight	Torque (ft - lb) **(kg - m)**					
			Grade					
(in.)	**(mm)**	(lb/ft)	J-55		C-75 & N-80		P-105	
2.375	**60.3**	5.95, 6.20 & 7.70	1600	**220**	2200	**305**	2700	**375**
2.875	**73.0**	7.9 & 8.7	2200	**305**	3000	**415**	3500	**485**
		9.5, 10.7 & 11.0	3200	**445**	4500	**620**	5500	**760**
3.500	**88.9**	12.8,12.95 & 15.8	4000	**555**	5500	**760**	7000	**970**
		16.7	5000	**690**	7000	**970**	9000	**1245**
4.000	**101.6**	13.4	4000	**555**	5500	**760**	7000	**970**
4.500	**114.3**	15.5	4500	**620**	6000	**830**	7500	**1035**
		19.2	5500	**760**	7500	**1035**	9500	**1315**

HYDRIL PH-4
RECOMMENDED MAKE-UP TORQUE

OD		Weight	Torque (ft - lb) **(kg - m)**					
			Grade					
(in.)	**(mm)**	(lb/ft)	J-55		C-75 & N-80		P-105	
2.875	**73.0**	11.0, 11.65	4000	**555**	5000	**690**	6500	**900**
3.500	**88.9**	16.7	5500	**760**	7500	**1035**	9500	**1315**
		17.05	6000	**830**	8000	**1105**	10000	**1385**
4.000	**101.6**	19.0	6000	**830**	8500	**1175**	10500	**1450**
		22.5	7500	**1035**	9500	**1315**	11500	**1590**
4.500	**114.3**	21.6	7000	**970**	9500	**1315**	12000	**1660**
		24.6	7500	**1035**	10000	**1385**	13000	**1800**
		26.5	8500	**1175**	11500	**1590**	14500	**2005**

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HYDRIL CS
RECOMMENDED MAKE-UP TORQUE

OD		Weight	Torque (ft - lb) **(kg - m)** Grade			
(in.)	**(mm)**	(lb/ft)	J-55		C-75, N-80 & P-105	
1.050	**26.7**	1.2 & 1.5	200	**30**	300	**40**
1.315	**33.4**	1.8 & 2.25	300	**40**	400	**55**
1.660	**42.2**	2.4, 3.02 & 3.24	400	**55**	600	**85**
1.900	**48.3**	2.9, 3.64 & 4.19	600	**85**	800	**110**
2.063	**52.4**	3.25 & 4.50	700	**95**	900	**125**
2.375	**60.3**	4.7 & 5.3	1100	**150**	1500	**205**
2.875	**73.0**	6.5	1500	**205**	2100	**290**
3.500	**88.9**	9.3 & 10.3	2500	**345**	3000	**415**
4.000	**101.6**	11.0	3000	**415**	3500	**485**
4.500	**114.3**	12.75 & 13.5	3500	**485**	4500	**620**

ARMCO NU-LOCK
RECOMMENDED MAKE-UP TORQUE

OD		Weight	Torque (ft - lb) **(kg - m)**			
(in.)	**(mm)**	(lb/ft)	Minimum		Maximum	
2.375	**60.3**	4.7	1000	**140**	2000	**280**
2.875	**73.0**	6.5	1500	**210**	2500	**340**
3.500	**88.9**	9.3	2000	**280**	3000	**420**

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HYDRIL A-95
RECOMMENDED MAKE-UP TORQUE

OD		Weight (lb/ft)	Torque (ft - lb) **(kg - m)** Grade			
			J-55		C-75, N-80 & P-105	
(in.)	**(mm)**					
1.660	**42.2**	2.4	400	**55**	600	**85**
1.900	**48.3**	2.9	600	**85**	800	**110**
2.063	**52.4**	3.25	700	**95**	900	**125**
2.375	**60.3**	4.7	1100	**150**	1500	**205**
2.875	**73.0**	6.5	1500	**205**	2100	**290**
3.500	**88.9**	9.3	2500	**345**	3000	**415**
4.000	**101.6**	11.0	3000	**415**	3500	**485**
4.500	**114.3**	12.75	3500	**485**	4500	**620**

RUCKER ATLAS BRADFORD FL-3S AND FL-4S
RECOMMENDED MAKE-UP TORQUE

OD		Weight (lb/ft)	Torque (ft - lb) **(kg - m)** Grade			
			J-55 & K-55		C-75, N-80 & P-105	
(in.)	**(mm)**					
2.375	**60.3**	4.70 & 5.95 6.65	400 500	**55** **70**	500 600	**70** **85**
2.875	**73.0**	6.50 & 7.90 8.70 & 10.40	600 700	**85** **45**	800 900	**110** **125**
3.500	**88.9**	7.70, 9.30 & 10.30 12.70, 12.95 & 15.50	1400 1500	**195** **205**	1600 1700	**220** **235**
4.000	**101.6**	9.50 11.00 & 11.60 14.00	2000 2200 2400	**275** **305** **330**	2300 2500 2700	**320** **345** **375**
4.500	**114.3**	9.50 & 10.50 11.60 & 12.60 13.50 & 15.10 16.90 & 19.20	2500 2700 3000 3200	**345** **375** **415** **445**	3200 3500 3700	**445** **485** **510**

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VALLOUREC VAM
RECOMMENDED MAKE-UP TORQUE

OD (in.) **(mm)**	Weight (lb/ft)	Grade	Torque (ft - lb) **(kg - m)**					
			Minimum		Optimum		Maximum	
1.900 **48.3**	2.9	C-75, N-80, C-90, C-95, & P-105	440	**60**	580	**80**	720	**100**
2.375 **60.3**	4.60	K-55 C-75 & N-80 C-90, C-95, P-105	1400 1800 2000	**190** **250** **275**	1450 2000 2150	**200** **275** **300**	1600 2350 2500	**220** **325** **350**
	5.10	K-55 C-75 & N-80 C-90, C-95, P-105	1450 1800 2150	**200** **250** **300**	1600 2000 2350	**225** **275** **325**	1800 2350 2700	**250** **325** **375**
	5.80	K-55,C-75 & N-80 C-90, C-95, P-105	1800 2500	**250** **350**	2000 2700	**275** **375**	2350 3100	**325** **425**
	6.30	K-55 C-75, N-80,C-90, C-95 & P-105	2500 2900	**350** **400**	2700 3100	**375** **425**	2900 3450	**400** **475**
	7.30	K-55 C-75 & N-80 C-90, C-95, P-105	2500 2900 3250	**350** **400** **450**	2700 3100 3450	**375** **425** **475**	2900 3600 3800	**480** **500** **525**
2.875 **73.0**	6.40	K-55 C-75 & N-80,C-90, C-95, P-105	2150 2500	**300** **350**	2350 2700	**325** **375**	2500 2900	**350** **400**
	7.70	K-55 C-75 & N-80 C-90 & C-95, P-105	2500 3100 3100	**350** **425** **425**	2700 3250 3250	**375** **450** **450**	2900 3600 3800	**400** **500** **525**
	8.60	K-55 C-75 & N-80,C-90, C-95, P-105	2500 3100	**350** **425**	2700 3250	**375** **450**	2900 3800	**400** **525**
	9.70	K-55 C-75 & N-80 C-90, C-95 P-105	3250 3600 4000 4000	**450** **500** **550** **550**	3450 3800 4150 4150	**475** **525** **575** **575**	3600 4400 4500 4700	**500** **600** **625** **650**
	10.70	K-55 C-75 & N-80 C-90, C-95, P-105	3250 4000 4150 4150	**450** **550** **575** **575**	3450 4150 4400 4400	**475** **575** **600** **600**	3600 4700 4700 4900	**500** **650** **650** **675**
3.500 **88.9**	7.70	K-55 C-75 & N-80 C-90, C-95, P-105	2500 2900 3450	**350** **400** **475**	2900 3250 3800	**400** **450** **525**	3250 3600 4150	**450** **500** **575**

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VALLOUREC VAM
RECOMMENDED MAKE-UP TORQUE

OD (in.) (mm)	Weight (lb/ft)	Grade	Torque (ft - lb) (kg - m)					
			Minimum		Optimum		Maximum	
3.500 **88.9**	9.2	K-55 C-75 & N-80 C-90 & C-95 P-105	2500 3250 4300 4300	**350** **450** **600** **600**	2900 3600 4700 4700	**400** **500** **650** **650**	3250 4000 5100 5400	**450** **550** **700** **750**
	10.2	K-55 C-75 & N-80 C-90, C-95, P-105	3450 4300 4700	**475** **600** **650**	3800 4700 5100	**525** **650** **700**	4150 5800 6200	**575** **800** **850**
	12.7	K-55 C-75 & N-80 C-90, C-95, P-105	4400 5400 6000	**600** **750** **825**	4700 5800 6300	**650** **800** **875**	5100 6900 7400	**700** **950** **1025**
	13.7	K-55 C-75 & N-80 C-90, C-95, P-105	5400 5400 6900	**750** **750** **950**	5800 5800 7200	**800** **800** **1000**	6200 7200 8300	**850** **1000** **1150**
	14.7	K-55 C-75 & N-80 C-90, C-95, P-105	5400 6300 7200	**750** **875** **1000**	5800 6700 7600	**800** **925** **1050**	6200 8000 8700	**850** **1100** **1200**
4.000 **101.6**	9.5	K-55 C-75, N-80 C-90, C-95 & P-105	2150 2900	**300** **400**	2500 3600	**350** **500**	2900 4400	**400** **600**
	10.9	K-55 C-75, N-80 C-90, C-95 & P-105	2700 3250	**375** **450**	3450 4000	**475** **550**	4100 4700	**575** **650**
	13.0	K-55 C-75, N-80 C-90, C-95 & P-105	3600 4000 4150	**500** **550** **575**	4400 4700 4900	**600** **650** **675**	5100 5400 5600	**700** **750** **775**
	14.8	K-55 C-75, N-80 C-90, C-95 & P-105	4400 5100	**600** **700**	5100 5800	**700** **800**	5800 6500	**800** **900**
	16.5	K-55 C-75, N-80 C-90, C-95 & P-105	4400 5250 5800	**600** **725** **800**	5100 6000 6500	**700** **825** **900**	5800 6700 7200	**800** **925** **1000**
4.500 **114.3**	12.6	K-55 C-75, N-80 C-90, C-95 & P-105	4400 4400	**600** **600**	4700 4700	**650** **650**	5100 5800	**700** **800**

Note: Vallourec recommends that a 0.6 correction factor be applied to the above values when Bakerseal Thread Sealing Compound is used, i.e., multiply value listed by 0.6.

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EXTREME LINE
RECOMMENDED MAKE-UP TORQUE

OD		Weight (lb/ft)	Grade	Torque (ft - lb) **(kg - m)**			
				Optimum		Maximum	
(in.)	**(mm)**						
2.375	**60.3**	4.70 & 5.95	J-55 N-80 P-105	1700 1700 1700	**235** **235** **235**	2300 2800 3300	**320** **385** **455**
2.875	**73.0**	6.5 & 8.7	J-55 N-80 P-105	2100 2100 2100	**290** **290** **290**	2600 3100 3600	**360** **430** **500**
3.500	**88.9**	9.3 & 12.95	J-55 N-80 P-105	2400 2400 2400	**330** **330** **330**	3000 3500 4000	**415** **485** **555**

HYDRIL CFJ-P
RECOMMENDED MAKE-UP TORQUE

OD		Weight (lb/ft)	Torque (ft - lb) **(kg - m)**			
			Grades J-55 & N-80			
			J-55		C-75, N-80 & P-105	
(in.)	**(mm)**					
2.375	**60.3**	4.7 & 5.3	800	**110**	1100	**150**
2.875	**73.0**	6.5	1100	**150**	1500	**205**
3.500	**88.9**	9.3 & 10.3	1500	**205**	1900	**260**
4.000	**101.6**	11.0	2000	**275**	2700	**375**
4.500	**114.3**	12.75	3000	**415**	4000	**555**

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HYDRIL FJ
RECOMMENDED MAKE-UP TORQUE

OD		Weight (lb/ft)	Torque (ft - lb) **(kg - m)**	
(in.)	**(mm)**		Grades J-55 & N-80	
2.375	**60.3**	4.6	400	**55**
2.875	**73.0**	6.4	600	**85**
3.500	**88.9**	9.2, 10.2, 12.8 & 15.5	800	**110**
4.000	**101.6**	11.0, 11.6 & 13.4	1100	**150**
4.500	**114.3**	12.6 & 13.5	1500	**205**

HYDRIL SUPER FJ
RECOMMENDED MAKE-UP TORQUE

OD		Weight (lb/ft)	Torque (ft - lb) **(kg - m)**	
(in.)	**(mm)**		Grades J-55 & N-80	
2.375	**60.3**	4.6	700	**95**
2.875	**73.0**	6.4	1000	**140**
3.500	**88.9**	9.2, 10.2, 12.8 & 15.5	1300	**180**
4.000	**101.6**	11.0, 11.6 & 13.4	1800	**250**
4.500	**114.3**	12.6 & 13.5	2500	**345**

ARMCO SEAL LOCK
RECOMMENDED MAKE-UP TORQUE

OD		Weight (lb/ft)	Torque (ft - lb) **(kg - m)**					
			Minimum		Optimum		Maximum	
(in.)	**(mm)**							
2.375	**60.3**	4.6 & 5.8	800	**110**	1000	**140**	1200	**165**
2.875	**73.0**	6.4 & 8.6	1000	**140**	1200	**165**	1400	**195**
3.500	**88.9**	9.2 & 12.7	1600	**220**	1800	**250**	2000	**275**

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MANNESMANN TDS
RECOMMENDED MAKE-UP TORQUE

OD		Weight	Grade	Torque (ft - lb) **(kg - m)**			
				Minimum		Maximum	
(in.)	**(mm)**	(lb/ft)					
2.375	**60.3**	4.6	K-55 C-75, N-80 C-90, C-95 P-105	950	**130**	1100 1250 1300 1400	**150** **170** **180** **190**
		5.8	K-55 C-75, N-80 C-90, C-95 P-105	1100	**150**	1250 1500 1650 1800	**170** **210** **230** **250**
2.875	**73.0**	6.4	K-55 C-75, N-80 C-90, C-95 P-105	1400	**190**	1500 1800 2000 2200	**210** **250** **280** **300**
		8.6	K-55 C-75, N-80 C-90, C-95 P-105	1600	**220**	2000 2500 2700 2900	**280** **340** **370** **400**
3.500	**88.9**	9.2	K-55 C-75, N-80 C-90, C-95 P-105	2200	**300**	2500 3000 3300 3600	**340** **420** **460** **500**
		10.2	K-55 C-75, N-80 C-90, C-95 P-105	2400	**330**	2700 3500 3900 4300	**370** **490** **540** **590**
		12.7	K-55 C-75, N-80 C-90, C-95 P-105	2900	**400**	3600 4600 5200 5800	**500** **640** **720** **800**
4.000	**101.6**	11.0	K-55 C-75, N-80 C-90, C-95 P-105	2300	**320**	2900 3600 4000 4300	**400** **500** **550** **600**
4.500	**114.3**	12.6	K-55 C-75, N-80 C-90, C-95 P-105	2300	**320**	3500 4300 4800 5200	**480** **600** **660** **720**
		13.5	K-55 C-75, N-80 C-90, C-95 P-105	2500	**340**	3600 4600 5000 5400	**500** **640** **690** **750**
		15.1	K-55 C-75, N-80 C-90, C-95 P-105	2700 4000 4700 5400	**380** **550** **650** **750**	5100 6900 7600 8300	**700** **950** **1050** **1150**

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RUCKER ATLAS BRADFORD IJ-3SS
RECOMMENDED MAKE-UP TORQUE

OD		Weight	Torque (ft - lb) **(kg - m)**					
			Grade					
(in.)	**(mm)**	(lb/ft)	J-55		C-75 & N-80		P-105	
1.315	**33.4**	1.80	200	**30**	300	**40**	400	**55**
1.660	**42.2**	2.40	400	**55**	500	**70**	600	**85**
1.900	**48.3**	2.90	500	**70**	600	**85**	800	
2.063	**52.4**	3.40	600	**85**	800	**110**	1000	**140**
2.375	**60.3**	4.70 5.30 5.95 6.20 7.70	1100 1300 1500 1700 2000	**150** **180** **205** **235** **275**	1300 1500 1700 1900 2200	**180** **205** **235** **260** **305**	1500 1700 1900 2100 2400	**205** **235** **260** **290** **330**
2.875	**73.0**	6.50 7.90 8.70 9.50 11.00 11.65	1600 2200 2600 3000 3600 4000	**220** **305** **360** **415** **500** **555**	1800 2600 3000 3500 4000 4500	**250** **360** **415** **485** **555** **620**	2200 3000 3500 4000 4400 5000	**305** **415** **485** **555** **610** **690**
3.500	**88.9**	9.30 10.30 12.95	2200 2600 **3000**	**305** **360** **415**	2600 3000 3500	**360** **415** **485**	3000 3500 4000	**415** **485** **555**
4.000	**101.6**	11.00 13.40	2400 3200	**330** **445**	2800 3600	**385** **500**	3200 4000	**445** **555**
4.500	**114.3**	12.75 15.50 19.20	2500 3500 4500	**345** **485** **620**	3000 4000 5500	**415** **555** **760**	3500 4500 6500	**485** **620** **900**

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RUCKER ATLAS BRADFORD IJ-4S AND TC-4S RECOMMENDED MAKE-UP TORQUE

OD		Weight (lb/ft)	Torque (ft - lb) **(kg - m)**					
			Grade					
(in.)	**(mm)**		J-55		C-75 & N-80		P-105	
2.375	**60.3**	4.70 & 5.30 5.95 & 6.20 7.70	1300 1800 2600	**180** **250** **360**	2000 2500 3200	**275** **345** **445**	2400 3000 3800	**330** **415** **525**
2.875	**73.0**	6.50 7.90, 8.70 & 9.50 11.00 & 11.65	1700 2000 2500	**235** **275** **345**	2600 3000 3600	**360** **415** **500**	3000 3500 4200	**415** **485** **580**
3.500	**88.9**	9.30 & 10.30 12.95 15.80 & 16.70	2300 2800 3000	**320** **385** **415**	3200 3700 4000	**445** **510** **555**	4100 4700 5000	**565** **650** **690**
4.000	**101.6**	11.00 13.40 22.80	3000 3500 5000	**415** **485** **690**	4000 4500 6000	**555** **620** **830**	4500 5500 7000	**620** **760** **970**
4.500	**114.3**	12.75 & 13.50 15.50 16.40 19.20 21.60	2900 3500 4000 5000 5000	**400** **485** **555** **690** **690**	4000 4500 6000 6000 6000	**555** **620** **830** **830** **830**	5000 5600 6500 7200 7500	**690** **775** **900** **995** **1035**

RUCKER ATLAS BRADFORD DS-HT MAXIMUM MAKE-UP TORQUE

OD		Weight (lb/ft)	Torque	
(in.)	**(mm)**		(ft-lb)	**(kg-m)**
1.315	**33.4**	1.80	300	**40**
1.660	**42.2**	2.40	400	**55**
1.900	**48.3**	2.90	550	**75**
2.063	**52.4**	3.40	700	**95**
2.375	**60.3**	4.70	900	**125**
2.875	**73.0**	6.50	1200	**165**
3.500	**88.9**	9.30	1300	**180**
4.000	**101.6**	11.00	2500	**345**
4.500	**114.3**	12.75	3000	**415**

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RUCKER ATLAS BRADFORD DSS-HT
RECOMMENDED MAKE-UP TORQUE

OD		Weight	Torque (ft - lb) **(kg - m)**					
			Grade					
(in.)	**(mm.)**	(lb/ft)	J-55		C-75 & N-80		P-105	
1.315	**33.4**	1.80 & 2.25	200	**30**	300	**40**	400	**55**
1.660	**42.2**	2.40	400	**55**	500	**70**	600	**85**
1.900	**48.3**	2.90	500	**70**	600	**85**	800	**110**
2.063	**52.4**	3.40	600	**85**	800	**110**	1000	**140**
2.375	**60.3**	4.70 5.30 5.45 6.20 7.70	1100 1300 1500 1700 2000	**150** **180** **205** **235** **275**	1300 1500 1700 1900 2200	**180** **205** **235** **260** **305**	1500 1700 1900 2100 2400	**205** **235** **260** **290** **330**
2.875	**73.0**	6.50 7.90 8.70 9.50 11.00 11.65	1600 2200 2600 3000 3600 4000	**220** **305** **360** **415** **500** **555**	1800 2600 3000 3500 4000 4500	**250** **360** **415** **485** **555** **620**	2200 3000 3500 4000 4400 5000	**305** **415** **485** **555** **610** **690**
3.500	**88.9**	9.30 10.30 12.95 15.80 16.70	2200 2600 3000 4000 4500	**305** **360** **415** **555** **620**	2600 3000 3500 5000 5500	**360** **415** **485** **690** **760**	3000 3500 4000 6000 6500	**415** **485** **555** **830** **900**
4.000	**101.6**	11.00 13.40 22.80	2400 3200 4000	**330** **445** **555**	2800 3600 4500	**385** **500** **620**	3200 4000 5000	**445** **555** **690**
4.500	**114.3**	12.75 13.50 15.50 16.90 19.20 21.60	2500 3000 3500 4000 4500 5000	**345** **415** **485** **555** **620** **690**	3000 3500 4000 4500 5500 6000	**415** **485** **555** **620** **760** **830**	3500 4000 4500 5000 6500 7000	**485** **555** **620** **690** **900** **970**

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RUCKER ATLAS BRADFORD IJ-4S AND TC-4S RECOMMENDED MAKE-UP TORQUE

OD		Weight	Torque (ft - lb) **(kg - m)**					
			Grade					
(in.)	**(mm)**	(lb/ft)	J-55		C-75 & N-80		P-105	
2.375	**60.3**	4.70 & 5.30 5.95 & 6.20 7.70	1300 1800 2600	**180** **250** **360**	2000 2500 3200	**275** **345** **445**	2400 3000 3800	**330** **415** **525**
2.875	**73.0**	6.50 7.90, 8.70 & 9.50 11.00 & 11.65	1700 2000 2500	**235** **275** **345**	2600 3000 3600	**360** **415** **500**	3000 3500 4200	**415** **485** **580**
3.500	**88.9**	9.30 & 10.30 12.95 15.80 & 16.70	2300 2800 3000	**320** **385** **415**	3200 3700 4000	**445** **510** **555**	4100 4700 5000	**565** **650** **690**
4.000	**101.6**	11.00 13.40 22.80	3000 3500 5000	**415** **485** **690**	4000 4500 6000	**555** **620** **830**	4500 5500 7000	**620** **760** **970**
4.500	**114.3**	12.75 & 13.50 15.50 16.40 19.20 21.60	2900 3500 4000 5000 5000	**400** **485** **555** **690** **690**	4000 4500 6000 6000 6000	**555** **620** **830** **830** **830**	5000 5600 6500 7200 7500	**690** **775** **900** **995** **1035**

RUCKER ATLAS BRADFORD DS-HT MAXIMUM MAKE-UP TORQUE

OD		Weight	Torque	
(in.)	**(mm)**	(lb/ft)	(ft-lb)	**(kg-m)**
1.315	**33.4**	1.80	300	**40**
1.660	**42.2**	2.40	400	**55**
1.900	**48.3**	2.90	550	**75**
2.063	**52.4**	3.40	700	**95**
2.375	**60.3**	4.70	900	**125**
2.875	**73.0**	6.50	1200	**165**
3.500	**88.9**	9.30	1300	**180**
4.000	**101.6**	11.00	2500	**345**
4.500	**114.3**	12.75	3000	**415**

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DRIFT INFORMATION FOR TUBING

Outside Diameter	Nominal Weight lb/ft T. & C.			Insider Diameter	Drift Diameter, in.		
						Integral-Joint	
	Non-Upset	Upset	Integral Joint		T.& C.	Full Length Before Upsetting	Pin End Drifting After Upsetting
1.050	1.14	1.20	—	0.824	0.730	—	—
1.315	1.70	1.80	1.72	1.049	0.955	0.955	.955
1.660	— 2.30	— 2.40	2.10 2.33	1.410 1.380	— 1.286	1.286 1.286	1.286 1.286
1.900	— 2.75	— 2.90	2.40 2.76	1.650 1.610	— 1.516	1.516 1.516	1.516 1.516
2.063	—	—	3.25	1.751	—	1.657	1.657
2-3/8	4.00 4.60 5.80	— 4.70 5.95	— — —	2.041 1.995 1.867	1.947 1.901 1.773	— — —	— — —
2-7/8	6.40 8.60	6.50 8.70	— —	2.441 2.259	2.347 2.165	— —	— —
3-1/2	7.70 9.20 10.20 12.70	— 9.30 — 12.95	— — — —	3.068 2.992 2.922 2.750	2.943 2.867 2.797 2.625	— — — —	— — — —
4	9.50 —	— 11.00	— —	3.548 3.476	3.423 3.351	— —	— —
4-1/2	12.60	12.75	—	3.958	3.833	—	—

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DRIFT SIZES FOR BARE AND COATED TUBING
OUTSIDE DIAMETER

Outside Diameter	Pipe		API Drift (bare pipe)		Plastic Drift for Coated Pipe	
	Lb. per ft.	ID	OD	Length	Thin Film Drift* Size	Thick Film Drift* Size
1.315	1.70 1.72 1.80	1.049	0.955	42	0.935	0.920
1.660	2.1	1.410	1.286	42	1.266	1.251
1.660	2.3 2.33 2.4	1.380	1.286	42	1.266	1.251
1.900	2.4	1.650	1.516	42	1.496	1.481
1.900	2.75 2.76 2.90	1.610	1.516	42	1.496	1.481
2-1/16	3.25	1.751	1.657	42	1.637	1.622
2-3/8	4.0	2.041	1.947	42	1.927	1.912
2-3/8	4.6 4.7	1.995	1.901	42	1.881	1.866
2-3/8	5.8 5.95	1.867	1.773	42	1.753	1.738
2-7/8	6.4 6.5	2.441	2.347	42	2.327	2.312
2-7/8	8.6 8.7	2.259	2.165	42	2.145	2.130
3-1/2	7.7	3.068	2.943	42	2.923	2.908
3-1/2	9.2 9.3	2.992	2.867	42	2.847	2.832
3-1/2	10.2	2.922	2.797	42	2.777	2.762
3-1/2	12.7 12.95	2.750	2.625	42	2.605	2.590
4	9.5	3.548	3.423	42	3.403	3.388
4	11.0	3.476	3.351	42	3.331	3.316
4-1/2	12.6 12.75	3.958	3.833	42	3.813	3.798

*Tolerance for plastic drifts, plus 0.000, minus 0.010 inches.

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CLASSIFICATION OF USED TUBING WORK STRINGS

I. EXTERIOR CONDITIONS (Tube Only)

1	2	3	4
PIPE BODY CONDITION	CRITICAL SERVICE CLASS One White Band	PREMIUM CLASS[2] Two White Bands	CLASS 2 Blue Bands
A. OD Wear Wall	Remaining wall not less than 87½%	Remaining wall not less than 80%	Remaining wall not less than 70%
B. Dents & Mashes	Diameter reduction not over 2% of OD	Diameter reduction not over 3% of OD	Diameter reduction not over 4% of OD
C. Slip Area, Tong Area Mechanical Damage			
1. Crushing[3], Necking	Diameter reduction not over 2% of OD	Diameter reduction not over 3% of OD	Diameter reduction not over 4% of OD
2. Cuts[4], Gouges[4]	Depth not to exceed 10% of the average adjacent wall	Depth not to exceed 10% of the average adjacent wall	Depth not to exceed 20% of the average adjacent wall
D. Stress Induced Diameter Variations			
1. Stretched	Diameter reduction not over 2% of OD	Diameter reduction not over 3% of OD	Diameter reduction not over 4% of OD
2. String Shot	Diameter increase not over 2% of OD	Diameter increase not over 3% of OD	Diameter increase not over 4% of OD
E. Corrosion, Cuts & Gouges			
1. Corrosion	Remaining wall not less than 87½%	Remaining wall not less than 80%	Remaining wall not less than 70%
2. Cuts & Gouges			
Longitudinal	Remaining wall not less than 87½%	Remaining wall not less than 80%	Remaining wall not less than 70%
Transverse	Remaining wall not less than 87½%	Remaining wall not less than 80%	Remaining wall not less than 80%
F. Fatigue Cracks[5]	None	None	None

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CLASSIFICATION OF USED TUBING WORK STRINGS

(Cont. from pg. 19-93)

II. INTERIOR CONDITION (Tube & Upset)

1	2	3	4
PIPE BODY CONDITION	CRITICAL SERVICE CLASS[1] One White Band	PREMIUM CLASS[2] Two White Bands	CLASS 2 Blue Bands
A. Corrosive Pitting Wall	Remaining wall not less than 87½% measured from the base of the deepest pit	Remaining wall not less than 80% measured from the base of the deepest pit	Remaining wall not less than 70% measured from the base of the deepest pit
B. Erosion & Wear Wall	Remaining wall not less than 87½%	Remaining wall not less than 80%	Remaining wall not less than 70%
C. Drift External Upset Internal Upset[7]	API dimensions 1/16" less than specified bored ID	API dimensions 1/16" less than specified bored ID	API dimensions 1/16" less than specified bored ID
D. Fatigue Cracks[3]	None	None	None

[1] The critical service classification is recommended for service where new or like new specifications apply. Critical service classification tubing work strings shall be identified with one white band.

[2] The premium classification is recommended for service where it is anticipated that torsion or tensile limits for Class 2 tubing work strings will be exceeded. Premium classification tubing work strings shall be identified with two white bands.

[3] Inspection of this condition should be made to detect presence of longitudinal and transverse cracks inside and outside.

[4] Remaining wall shall not be less than the value in I.E.2. Defects may be ground out providing the remaining wall is not reduced below the value shown in I.E.1 of this table and such grinding to be approximately faired into outer contour of the tubing.

[5] In any classification where fatigue cracks or washouts appear, the tubing will be identified with the red band and considered unfit for further service.

[6] Average adjacent wall is determined by measuring the wall thickness on each side of the cut or gouge adjacent to the deepest penetration.

[7] Applicable to Internal Upsets which have been bored.

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INTERCHANGEABILITY OF 10 RD INTEGRAL TUBING THREAD

Description	Joint OD	ID	Equivalent Thread Form	Joints Interchangeable With 10 Rd Integral Joint
1.315 OD 10 Rd API Integral Jt	1.550	.970	1.315 NU 10 Rd	Atlas, Aztec, Jal-Con-Weld 55, J & L Aztec, W.C. Norris, Kilby Steel SW Pipe
1.660 OD 10 Rd API Integral Jt	1.880	1.301	1.660 NU 10 Rd	Atlas, Aztec, Jal-Con-Weld 55, J & L Aztec, Southwestern Pipe, W.C. Norris, Kilby Steel, Tex-Tube
1.900 OD 10 Rd API Integral Jt	2.110	1.531	1.900 NU 10 Rd	Atlas, Aztec, Jal-Con-Weld 55, J & L Aztec, Southwestern Pipe, W.C. Norris, Kilby Steel,Tex-Tube
2.000 OD 10 Rd API Integral Jt	2.340	1.649	1.900 EU 10 Rd	Atlas
2.063 OD 10 Rd API Integral Jt	2.325	1.672	1.900 EU 10 Rd	Atlas, Aztec, Jal-Con-Weld 55, J & L Aztec, Southwestern Pipe, W.C. Norris, Kilby Steel, Tex-Tube, Youngstown YC050
2.375 OD 10 Rd API Integral Jt	2.625	1.926	2.375 NU 10 Rd	Atlas, Aztec, Jal-Con-Weld 55, J & L Aztec
2.875 OD 10 Rd API Integral Jt	3.150	2.372	2.875 NU 10 Rd	Aztec, Jal-Con-Weld 55, J & L Aztec

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1996 Tubular Design Tables: Part 1

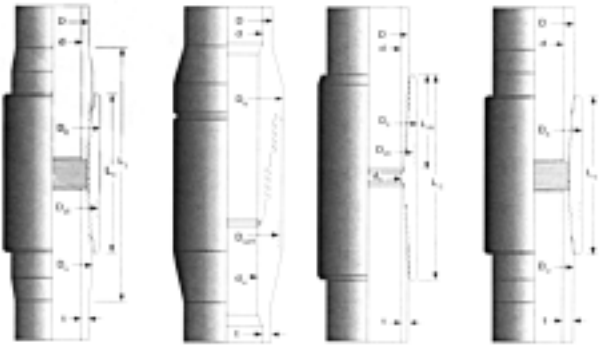
World Oil's new tubular design tables provide information on premium connection dimensions, available steel grades and make-up torques. These tables are organized by connnection manufacturing company name, and listings are accompanied by cut-away diagrams for visual cross reference with tabular data. Coupling type and sealing mechanism follow manufacturer and coupling name or designation. Critical tubular and connection areas can be used with minimum yield or ultimate strengths in designs and to calculate casing coupling tensile capacity. Part 1 includes pipe sizes up to 5½-in. OD or production-tubing-specific couplings.

Contents

Benoit Machine Inc. **77**
BTS 6 77
BTS 8 77
Echo/C4 77
Echo/F4 77
Echo/SS 77
Dalmine **77,78**
Antares MS 77, 78
Antares MS 28 ..... 77, 78
PJD 78
Enerpro International Inc. **78, 80, 82**
HD-L 78, 80
RFC 78
RSU-8 ..... 78, 80
RTS-6 80
RTS-8 80
SB (Special Bore) 80, 82
GB Tubulars, Inc. **82**
GB Acme and GB Acme I.S. 82
Grant Prideco **82, 83, 85**
Atlas Bradford FL-4S 82
Atlas Bradford ST-C/CST-C 82, 83
Atlas Bradford ST-L 83
Atlas Bradford ST-C/CST-P 83
Atlas Bradford TC-4S 83, 85
Atlas Bradford TC-II 83, 85
Halliburton Energy Services **85**
OECO "A" 85
OECO "C" 85
OECO "H" 85
Hunting Interlock, Inc. **85, 86, 88, 90**
Threadmasters Convertable WO Ring 85, 86
Threadmasters Convertable W/Ring 86
Threadmasters Convertable 4040 86
Threadmasters TKC 4040-NU 86
Threadmasters FJ-150 86
Threadmasters FS-150 86
HD Lock-It 86
I-J NU-Lock 88
I-J NU Lock PC 88
Lock-It-Eight 88
Threadmasters TKC MMS 88
Threadmasters TKC MMS 4040 88
Seal-Lock FGL 88
Seal-Lock PC 90
TC NU-Lock 90
TC NU-Lock PC 90
Threadmasters TKC 8RD 90
Threadmasters TKC 8RD Plus 90
Threadmasters TKC TS-8 90
Hydril **93, 94, 95**
CS/PH 6/PH 4 Tubing 93
Series 500 Type 501 93
Series 500 Type 503 93
Series 500 Type 561 93
Series 500 Type 533 ..... 93, 94
Series 500 Type 511 94
Series 500 Type 563 ..... 94, 95
HSC Corporation **94, 95**
HSC Tubing 94, 95
Iberia Threading Inc. **95**
IMT 95
ITS6 95
ITS8 95
Kawasaki Steel/Hunting Oilfield Services. **96**
Fox premium connection 96
Mannesmann **96, 101**
BDS-TG 96
MAT 96, 101
TDS 96, 101
NKK Corp **96, 101**
New NK-3SB 96, 101
NK 3SB 96, 101
NK-HW Casing 133, 134
Nippon Steel **102**
NS-CT 102
Siderca SA **102, 103**
SDS-RT8 102
SDS-T6 102
SDS-T8 102
SEC-FR 102, 103
SEC-ST 102, 103
Smith Fiberglass Products **103**
SDT 103
Star Fiber Glass Systems **103, 104**
Advanced Composite Thread 103, 104
TPS Technitube Röhrenwerke **104, 109**
TPS-Multiseal-TS-4 104
TPS-Multiseal-TS 6/TS 6 TR 104
TPS-Multiseal-TS 8/TS 8 TR 104
TPS-External-Upset Optiflow 104
TPS-Non-Upset Optiflow 109
Techniseal 109
Tubular Fiberglass Co. **109**
Red Box 109
VAM Group (Sumitomo/Tubular Industries Scotland/
VAM PTS/Vallourec Oil & Gas/) **110, 112, 114**
NEW VAM 110
VAM ACE 110, 112
VAM FJL 112,114
VAM Ace XS/X8-C 114

Dimension nomenclature

D Nominal OD of tube, in.
D Coupling OD, in.
D_1 Upset pin OD, in.
w Weight of tube, lb/ft
D_2 Coupling OD, special clearance or flush, in.
D_3, $_4$ Upset joint OD, special clearance or flush, in.
d Tube ID, in.
d_1 Internal upset ID, in.
d Coupling ID, (when less than pin ID), in.
t Tube wall thickness, in.
L_2 Coupling length, in.
L Thread length, upset to upset, in.
A_3 Tube critical area, sq in.
Coupling critical area, sq in.
A Connection critical area, sq in.
L_4 Make-up loss, in.



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BENOIT BTS is a two-step, multiseal integral joint connection designed for superior performance and durability. It comes with six pitch (BTS-6) and eight pitch (BTS-8) threads and is available with a protective ring for coated tubing.

BENOIT ECHO/C4 is a premium coupled connection with multiple seals designed for deep, high-pressure wells. It features 15° seal/torque shoulder with self-activating metal-to-metal pin flank seal, interference thread seal and teflon seal. Fast make-up and breakout with strong resistance to back off makes it applicable to any high-pressure job.

BENOIT ECHO/F4 is offered in tubing sizes from 2⅜ to 4½ in. It has a flush OD with a swaged and bored pin end. Multiple seals include trapped 15° torque shoulder/ external seal, metal-to-metal pin flank seal, interference thread seal, optional teflon ring, and features maximum efficiency for every weight.

BENOIT ECHO/SS is a premium integral connection for applications requiring high joint strength and maximum resistance to leakage in deep, high-pressure wells. It has multiple seals, which include shoulder, teflon and interference thread seals. SS is available with metal-to-metal pin flank seal and PR ring for coating.

DALMINE ANTARES MS (metal seal) is an improved metal-to-metal seal connection that out performs single metal seal and API connections. Coupled efficiency is equivalent to pipe body. Pin end, with protected convex sealing surface, is cut on pipe body. Box end energizes tapered sealing surface through reverse angle internal torque shoulder.

DALMINE ANTARES MS 28 tubing connections fill requirements of deep, sour hydrocarbon wells. It is designed for easy stabbing and make-up and to withstand field handling. It is capable of withstanding high mechanical stress while providing gas-tight sealing at full pressure rating in the worst possible conditions, and is for use with corrosion resistant alloys (CRA).

Benoit — BTS-6

Type: Integral, upset		Seal: Metal-to-metal					L/N-80	P-110
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb	
2.375	6.0	1.805	2.906	2.782	1.692	....	2.2-2.75	2.7-3.375
2.375	6.2	1.795	2.938	2.794	1.733	....	2.2-2.75	2.7-3.375
2.375	7.7	1.645	3.125	2.924	2.152	....	2.2-2.75	2.7-3.375
2.875	7.9	2.265	3.438	3.312	2.254	....	3.0-3.375	3.5-4.375
2.875	8.7	2.200	3.500	3.365	2.484	....	3.0-3.375	3.5-4.375
2.875	9.5	2.130	3.625	3.419	2.708	....	4.5-5.625	5.5-6.875
2.875	10.7	2.030	3.688	3.509	3.058	....	4.5-5.625	5.5-6.875
3.500	13.0	2.687	4.313	4.189	3.682	....	5.5-6.875	7.0-8.75
3.500	15.8	2.485	4.500	4.367	4.522	....	5.5-6.875	7.0-8.75

Benoit — BTS-8

Type: Integral, upset		Seal: Metal-to-metal					J-55	L/N-80	P-110
D	w	d	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb		
0.750	1.2	0.824	1.327	1.300	0.226	....	0.2-0.25	0.3-0.375	0.3-0.375
0.750	1.5	0.742	1.327	....	0.288	....	0.2-0.25	0.3-0.375	0.3-0.375
1.000	1.8	1.049	1.552	1.525	0.362	....	0.3-0.375	0.4-0.5	0.4-0.5
1.000	2.3	0.957	1.600	....	0.462	....	0.3-0.375	0.4-0.5	0.4-0.5
1.250	2.4	1.380	1.883	1.858	0.488	....	0.4-0.5	0.6-0.75	0.6-0.75
1.250	3.0	1.278	1.927	....	0.635	....	0.4-0.5	0.6-0.75	0.6-0.75
1.250	3.2	1.264	1.927	....	0.654	....	0.4-0.5	0.6-0.75	0.6-0.75
1.500	2.9	1.610	2.113	2.094	0.617	....	0.6-0.75	0.8-1.0	0.8-1.0
1.500	3.6	1.500	2.162	1.440	0.817	....	0.6-0.75	0.8-1.0	0.8-1.0
2.063	3.3	1.751	2.335	2.295	0.934	....	0.7-0.875	0.9-1.125	0.9-1.125
2.063	4.5	1.613	2.460	2.407	1.299	....	0.7-0.875	0.9-1.125	0.9-1.125
2.375	4.7	1.995	2.705	2.655	1.304	....	1.1-1.375	1.5-1.875	1.5-1.875
2.375	5.3	1.939	2.750	2.700	1.477	....	1.1-1.375	1.5-1.875	1.5-1.875
2.875	6.5	2.441	3.220	3.166	1.812	....	1.5-1.875	2.1-2.625	2.1-2.625
3.500	9.3	2.992	3.915	3.859	2.590	....	2.5-3.125	3.0-3.750	3.0-3.750
3.500	10.3	2.922	3.980	3.914	2.915	....	2.5-3.125	3.0-3.750	3.0-3.75

Benoit — ECHO/C4

Type: Coupled		Seal: Metal-to-metal, seal ring					L/N-80	P-110
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb	
2.375	4.7	1.995	2.750	....	1.304	....	....	....
2.375	5.3	1.939	2.750	....	1.477	....	....	....
2.375	6.0	1.867	2.800	....	1.692	....	....	....
2.375	6.2	1.853	2.800	....	1.733	....	....	....
2.375	7.7	1.703	2.900	....	2.152	....	....	....
2.875	6.5	2.441	3.250	....	1.812	....	....	....
2.875	7.9	2.323	3.375	....	2.254	....	....	....
2.875	8.7	2.259	3.375	....	2.484	....	....	....
2.875	9.5	2.195	3.450	....	2.708	....	....	....
2.875	11.0	2.065	3.500	....	3.143	....	....	....
2.875	11.7	1.995	3.550	....	3.366	....	....	....
3.500	9.3	2.992	3.950	....	2.590	....	....	....
3.500	10.3	2.922	3.950	....	2.915	....	....	....
3.500	13.0	2.750	4.100	....	3.682	....	....	....
3.500	15.8	2.548	4.200	....	4.522	....	....	....

Benoit — ECHO/F4

Type: Flush		Seal: Metal-to-metal, seal ring					L/N-80	P-110
D	w	d	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb	
2.375	4.4	1.995	....	....	1.304	0.531	....	....
2.375	5.8	1.867	....	....	1.692	0.877	....	....
2.375	6.3	1.815	....	....	1.843	0.960	....	....
2.875	6.2	2.441	....	....	1.812	0.751	....	....
2.875	7.7	2.323	....	....	2.254	1.175	....	....
2.875	8.4	2.259	....	....	2.484	1.307	....	....
2.875	9.7	2.151	....	....	2.858	1.805	....	....
3.500	8.8	2.992	....	....	2.590	1.343	....	....
3.500	9.9	2.922	....	....	2.915	1.458	....	....
3.500	12.5	2.750	....	....	3.682	2.312	....	....
3.500	15.4	2.548	....	....	4.522	2.800	....	....
4.000	9.1	3.548	....	....	2.680	1.111	....	....
4.000	10.5	3.476	....	....	3.077	1.615	....	....
4.000	11.3	3.428	....	....	3.337	1.746	....	....
4.000	12.9	3.340	....	....	3.805	2.004	....	....
4.500	9.4	4.090	....	....	2.766	1.136	....	....
4.500	10.2	4.052	....	....	3.009	1.253	....	....
4.500	10.8	4.026	....	....	3.174	1.327	....	....
4.500	11.4	4.000	....	....	3.338	1.728	....	....
4.500	12.2	3.958	....	....	3.600	1.879	....	....
4.500	13.0	3.920	....	....	3.836	2.012	....	....
4.500	15.0	3.826	....	....	4.407	2.320	....	....
4.500	16.4	3.754	....	....	4.836	3.046	....	....
4.500	18.7	3.640	....	....	5.498	3.470	....	....

Benoit — ECHO/SS

Type: Integral, upset		Seal: Threaded, seal ring					L/N-80	P-110
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb	
0.750	1.2	0.809	1.325	....	0.226	....	....	....
0.750	1.5	0.727	1.350	....	0.288	....	....	....
1.000	1.8	0.985	1.562	....	0.362	....	....	....
1.250	2.4	1.301	1.893	....	0.488	....	....	....
1.250	3.0	1.205	1.960	....	0.635	....	....	....
1.500	2.9	1.531	2.123	....	0.617	....	....	....
2.063	3.3	1.700	2.340	....	0.934	....	....	....
2.063	4.5	1.545	2.460	....	1.299	....	....	....
2.375	4.7	1.945	2.710	....	1.304	....	....	....
2.375	5.3	1.890	2.710	....	1.477	....	....	....
2.375	6.0	1.805	2.910	....	1.692	....	....	....
2.375	6.2	1.795	2.910	....	1.733	....	....	....
2.375	7.7	1.645	3.135	....	2.152	....	....	....
2.875	6.5	2.378	3.230	....	1.812	....	....	....
2.875	7.9	2.265	3.385	....	2.254	....	....	....
2.875	8.7	2.200	3.510	....	2.484	....	....	....
2.875	9.5	2.133	3.635	....	2.708	....	....	....
2.875	11.0	2.003	3.760	....	3.143	....	....	....
2.875	11.7	1.933	3.760	....	3.366	....	....	....
3.500	9.3	2.920	3.875	....	2.590	....	....	....
3.500	10.3	2.878	3.947	....	2.915	....	....	....
3.500	13.0	2.687	4.260	....	3.682	....	....	....
3.500	15.8	2.470	4.385	....	4.522	....	....	....

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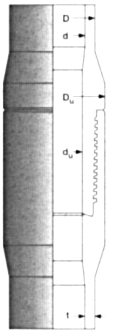
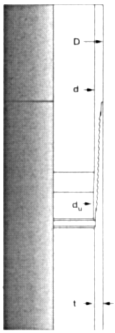
1996 Tubular Design Tables: Part I



DALMINE PJD (Premium Joint Dalmine) is an integral joint, upset tubing connection. Turned OD and bored ID allow maximum clearance and product flow. Primary external torque shoulder and secondary reverse angle shoulder ensure proper make-up and stress resistance. High performance conical modified buttress threads exceed pipe body strength. Internal metal-to-metal seal remains fully functional after repeated make-up, providing excellent leak resistance for high-pressure wells.



ENERPRO International HD-L is a premium flush OD connection that provides superior pressure resistance and structural integrity. Connector design features identical 5° radial metal-to-metal internal and external pressure seals rated to API internal and collapse pressure ratings for pipe body. It has a robust hooked thread form that resists cross-threading and jump-out, equal critical areas in tension and compression. It exhibits excellent resistance to cyclical, combined loading including bending, and has been successfully used for severe applications in straight and directional wells.

Dalmine Tubi Industriali S.r.l. — ANTARES MS

Type: Coupled Seal: Metal-to-metal — H-40 J-55 K-55/C-75 L-80 N-80/C-90 C/T-95 P-110 Q-125 Grade 140 D100 SSG

D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb
2.375	4.6	1.995*	2.776	N/A	1.304	1.734	
2.375	5.1	1.939	2.776	N/A	1.477	1.734	
2.375	5.8	1.867	2.815	N/A	1.692	1.903	
2.875	6.4	2.441*	3.339	N/A	1.812	2.503	
2.875	7.7	2.323	3.406	N/A	2.254	2.868	
2.875	8.6	2.259*	3.406	N/A	2.484	2.868	
3.500	7.7	3.068*	3.917	N/A	2.228	2.891	
3.500	9.2	2.992	3.917	N/A	2.590	2.891	
3.500	10.2	2.922	3.996	N/A	2.915	3.382	
3.500	12.7	2.750	4.134	N/A	3.682	4.261	
4.000	10.9	3.476	4.421	N/A	3.077	3.463	
4.000	13.0	3.340	4.551	N/A	3.805	4.349	
4.000	14.9	3.240	4.646	N/A	4.322	5.033	
4.500	10.5	4.052	4.921	N/A	3.009	3.984	
4.500	11.6	4.000	4.921	N/A	3.338	3.984	
4.500	12.6	3.958	4.921	N/A	3.600	3.984	
4.500	13.5	3.920	4.961	N/A	3.836	4.289	
4.500	15.1	3.826	5.079	N/A	4.407	5.220	

*du value is less than d

Contact Dalmine Tubi Industriali for torque data.

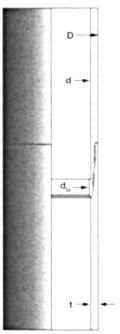
Dalmine Tubi Industriali S.r.l. — ANTARES MS 28

Type: Coupling Seal: Metal-to-metal — H-40 J-55 K-55 C-75/L-80 N-80/C-90 C/T-95 P-110 Q-125 Grade 140 D100 SSG

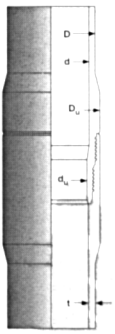
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb
2.375	4.6	1.995*	2.705	N/A	1.304	1.507	
2.375	5.1	1.939	2.756	N/A	1.477	1.734	
2.375	5.8	1.867	2.827	N/A	1.692	2.046	
2.875	6.4	2.441*	3.244	N/A	1.812	2.072	
2.875	7.7	2.323	3.354	N/A	2.254	2.644	
2.875	8.6	2.259	3.406	N/A	2.484	2.916	
3.500	7.7	3.068*	3.937	N/A	2.228	2.954	
3.500	9.2	2.992*	3.937	N/A	2.590	2.954	
3.500	10.2	2.922	4.000	N/A	2.915	3.346	
3.500	12.7	2.750	4.142	N/A	3.682	4.253	
4.000	10.9	3.476*	4.441	N/A	3.077	3.455	
4.000	13.0	3.340	4.567	N/A	3.805	4.346	
4.000	14.9	3.240	4.665	N/A	4.322	5.061	
4.500	10.5	4.052*	4.921	N/A	3.009	3.853	
4.500	11.6	4.000*	4.921	N/A	3.338	3.853	
4.500	12.6	3.958	4.961	N/A	3.600	4.159	
4.500	13.5	3.920	5.000	N/A	3.836	4.467	
4.500	15.1	3.826	5.079	N/A	4.407	5.090	

*du value is less than d

Contact Dalmine Tubi Industriali for torque data.



ENERPRO INTERNATIONAL RFC provides maximum downhole clearance. Pin connection is threaded on a swaged and stress-relieved end, which reduces wall thickness variation in pin nose. The integral connection uses a two-step thread profile with multiple seals that incorporate a primary (14°) self-energizing seal to seal internal pressure and secondary (30°) seal to bar external pressure.



ENERPRO INTERNATIONAL RSU-8 and Special Clearance connections have a two-step modified buttress thread form that is high in tension, burst and collapse ratings. It has a 14° sliding, metal-to-metal seal on pin nose that is pressure energized and 30° torque shoulder that is also a metal-to-metal seal. Pin nose is swaged and stress-relieved before threading to ensure leak-tightness. It is interchangeable with ENERPRO RTS-8 in the same sizes.

Dalmine Tubi Industriali S.r.l. — PJD

Type: Upset integral Seal: Metal-to-metal — H-40 J-55 K-55/C-75 L-80 N-80/C-90 C/T-95 P-110 Q-125 Grade 140 D100 SSG

D	w	du	Du	Duct	At	Ac		Make-up torque, 1,000 ft-lb
2.375	4.7	1.957	2.776	N/A	1.304	1.325		
2.375	5.3	1.902	2.776	N/A	1.477	1.494		
2.375	6.0	1.827	2.894	N/A	1.692	1.714		
2.875	6.5	2.402	3.287	N/A	1.812	1.838		
2.875	7.9	2.283	3.406	N/A	2.254	2.275		
2.875	8.7	2.220	3.465	N/A	2.484	2.499		
2.875	9.5	2.157	3.524	N/A	2.708	2.717		
3.500	9.3	2.941	3.980	N/A	2.590	2.688		
3.500	10.3	2.870	3.980	N/A	2.915	3.013		
3.500	13.0	2.701	4.272	N/A	3.682	3.757		
4.000	11.0	3.425	4.449	N/A	3.077	3.278		
4.000	13.4	3.291	4.508	N/A	3.805	3.984		
4.500	12.8	3.909	4.941	N/A	3.600	3.918		
4.500	13.5	3.870	4.941	N/A	3.836	4.125		
4.500	15.5	3.776	5.059	N/A	4.407	4.690	0.0	

Contact Dalmine Tubi Industriali for torque values.

ENERPRO International, Inc. — RFC

Type: Flush Seal: Metal-to-metal

D	w	du	Du	Duct	At	Ac	J/K	L/N-80	P-110	95-High Collapse
							Make-up torque, 1,000 ft-lb			
2.375	4.7	1.945	....	....	1.304	0.612	4-5	4-5	5-6	....
2.375	6.0	1.817	....	....	1.692	0.964	4-5	4-5	55-7	....
2.875	6.5	2.361	....	....	1.812	0.893	6-75	6-75	8-10	....
2.875	7.9	2.323	....	....	2.254	0.893	6-75	6-75	8-10	....
2.875	8.7	2.259	....	....	2.484	0.893	6-75	6-75	8-10	....
3.500	9.3	2.930	....	....	2.590	1.330	8-10	8-10	10-12	....
3.500	10.3	2.842	....	....	2.915	1.548	8-10	8-10	10-12	....
3.500	12.8	2.684	....	....	3.621	2.064	8-10	8-10	11-13	....
3.500	13.0	2.670	....	....	3.682	2.064	8-10	8-10	11-13	....
3.500	15.5	2.522	....	....	4.304	2.064	8-10	8-10	11-13	....
3.500	15.8	2.468	....	....	4.522	2.064	8-10	8-10	11-13	....
4.000	9.5	3.468	....	....	2.680	1.229	11-13	11-13	15-18	....
4.000	11.0	3.396	....	....	3.077	1.649	11-13	11-13	15-18	....
4.000	11.6	3.348	....	....	3.337	1.803	11-13	11-13	15-18	....
4.000	13.4	3.260	....	....	3.805	1.999	11-13	11-13	15-18	....
4.500	9.5	3.990	....	....	2.766	1.162	13-16	13-16	18-22	....
4.500	10.5	3.962	....	....	3.009	1.405	13-16	13-16	18-22	....
4.500	11.6	3.910	....	....	3.338	1.734	13-16	13-16	18-22	....
4.500	12.6	3.878	....	....	3.600	1.891	15-18	15-18	20-25	....
4.500	13.5	3.840	....	....	3.836	1.891	15-18	15-18	22-27	....
5.000	15.0	4.328	....	....	4.375	2.204	19-23	19-23	28-35	....
5.000	18.0	4.196	....	....	5.275	2.806	19-23	19-23	28-35	....
5.500	15.5	4.870	....	....	4.514	2.230	23-28	23-28	34-42	....
5.500	17.0	4.812	....	....	4.962	2.521	23-28	23-28	34-42	....

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ENERPRO International Inc.

HD-L

Type: Flush	Seal: Metal-to-metal						H-40	J-55	K-55	C-75	L-80	N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
D	w	du	Du	Duct	At	Ac					Make-up torque, 1,000 ft-lb							
2.375	5.3	1.868	...	...	1.477	0.710	...	...	3-4	...	3-4	3-4	4-5	4-5	4-5	5-6	5-6	6-7
2.375	6.0	1.806	...	...	1.692	0.885	...	...	3-4	...	4-5	4-5	4-5	4-5	5-6	6-7	7-8	7-8
2.375	6.2	1.792	...	...	1.733	0.913	...	...	3-4	...	4-5	4-5	5-6	5-6	6-7	6-7	7-8	7-8
2.375	7.7	1.647	...	...	2.152	1.139	...	...	5-6	...	7-8	7-8	7-8	7-8	8-9	9-10	10-11	10-11
2.875	6.5	2.371	...	...	1.812	0.885	...	...	3-4	...	5-6	5-6	5-6	5-6	6-7	7-8	7-8	8-9
2.875	7.9	2.258	...	...	2.254	1.194	...	...	5-6	...	7-8	7-8	7-8	7-8	8-9	9-10	10-11	10-12
2.875	8.7	2.194	...	...	2.484	1.349	...	...	5-6	...	7-8	7-8	7-8	7-8	8-9	9-10	9-11	10-11
2.875	9.5	2.140	...	...	2.708	1.467	...	...	6-7	...	7-8	7-8	8-9	8-9	9-10	10-11	10-12	11-12
2.875	10.7	2.036	...	...	3.058	1.727	...	...	7-8	...	9-10	9-10	10-11	10-11	11-12	12-13	13-14	13-15
3.500	9.3	2.908	...	...	2.590	1.392	...	...	6-7	...	7-8	7-8	7-8	7-8	8-9	9-10	10-11	10-11
3.500	10.3	2.838	...	...	2.915	1.717	...	...	6-7	...	7-8	7-8	8-9	8-9	9-10	9-10	10-11	10-11
3.500	13.0	2.666	...	...	3.682	1.970	...	...	11-12	...	13-15	13-15	14-16	15-16	17-19	18-21	20-22	21-24
3.500	15.8	2.464	...	...	4.522	2.780	...	...	11-12	...	13-15	13-15	14-16	15-16	16-18	18-20	19-22	20-23
4.000	11.0	3.393	...	...	3.077	1.695	...	...	8-9	...	10-11	10-11	11-13	11-13	13-15	14-16	15-18	16-19
4.000	11.6	3.345	...	...	3.337	1.861	...	...	10-11	...	12-14	12-14	14-15	14-15	16-18	17-20	19-22	20-23
4.000	13.4	3.257	...	...	3.805	2.046	...	...	10-11	...	12-13	12-13	13-14	13-14	15-16	16-18	17-20	18-21
4.500	11.6	3.918	...	...	3.338	1.773	...	...	12-13	...	14-15	14-15	15-16	15-16	16-17	17-19	18-20	19-20
4.500	12.8	3.876	...	...	3.600	1.901	...	...	15-16	...	18-19	18-19	19-20	19-20	21-23	22-25	24-27	25-28
4.500	13.5	3.838	...	...	3.836	2.023	...	...	17-19	...	21-23	21-23	22-24	23-24	25-28	27-30	29-33	31-34
4.500	15.1	3.744	...	...	4.407	2.316	...	...	20-22	...	25-28	25-28	27-30	28-30	30-34	33-37	36-41	38-43
4.500	16.9	3.658	...	...	4.836	2.641	...	...	20-22	...	25-28	25-28	27-30	28-30	30-34	33-37	36-41	38-43
4.500	19.2	3.558	...	...	5.498	3.194	...	...	20-22	...	25-28	25-28	27-30	28-30	30-34	33-37	36-41	38-43
4.500	21.6	3.418	...	...	6.283	3.979	...	...	20-22	...	25-28	25-28	27-30	28-30	30-34	33-37	36-41	38-43
5.000	15.0	4.327	...	...	4.374	2.013	...	...	24-27	...	30-34	30-34	32-36	34-36	37-42	41-46	44-50	46-53
5.000	18.0	4.195	...	...	5.275	2.736	...	...	24-27	...	30-34	30-34	32-36	34-36	37-42	41-46	44-50	46-53
5.000	20.3	4.103	...	...	5.886	3.317	...	...	24-27	...	30-34	30-34	32-36	34-36	37-42	41-46	44-50	46-53
5.000	20.8	4.075	...	...	6.069	3.500	...	...	24-27	...	30-34	30-34	32-36	34-36	37-42	41-46	44-50	46-53
5.000	21.4	4.045	...	...	6.264	3.695	...	...	24-27	...	30-34	30-34	32-36	34-36	37-42	41-46	44-50	46-53
5.000	23.2	3.963	...	...	6.791	4.191	...	...	24-27	...	30-34	30-34	32-36	34-36	37-42	41-46	44-50	46-53
5.000	24.1	3.919	...	...	7.069	4.469	...	...	24-27	...	30-34	30-34	32-36	34-36	37-42	41-46	44-50	46-53
5.500	15.5	4.871	...	...	4.514	2.444	...	...	16-18	...	21-24	21-24	23-27	24-27	27-32	31-35	34-39	36-41
5.500	17.0	4.813	...	...	4.962	2.325	...	...	27-30	...	35-39	35-39	37-42	39-42	43-49	47-54	52-59	55-63
5.500	20.0	4.699	...	...	5.828	2.995	...	...	27-30	...	35-39	35-39	37-42	39-42	43-49	47-54	52-59	55-63
5.500	23.0	4.591	...	...	6.630	3.762	...	...	27-30	...	35-39	35-39	37-42	39-42	43-49	47-54	52-59	55-63
5.500	26.0	4.546	...	...	7.513	4.612	...	...	27-30	...	35-39	35-39	37-42	39-42	43-49	47-54	52-59	55-63

ENERPRO INTERNATIONAL RTS-6, PR and Special Clearance connections have a two-step thread that offers tensile, burst and collapse ratings equal to or exceeding that of the pipe body. Metal seals maintain pressure integrity while straight thread profile eliminates high connection stresses. Shoulders provide high compressive strength and high torque capabilities. For tubulars requiring internal plastic coating, a Teflon and fiberglass ring (shown) is incorporated in connection box.

ENERPRO INTERNATIONAL RTS-8, PR and Special Clearance connections have a two-step thread that offers tensile, burst and collapse ratings equal to or exceeding that of the pipe body. Metal seals maintain pressure integrity while straight thread profile eliminates high connection stresses. Modified buttress thread and multiple torque shoulders provide high compressive strength and high torque capabilities. Available with PR ring.

ENERPRO International SB (Special Bore) is a version of the RTS connection with slightly increased diameter allowing bored upset ID to have a finished diameter equal to pipe body nominal ID, eliminating standard two-step tubing connector internal restriction. It offers reduced turbulence, easier wireline tool running, more uniform plastic coating and reduced wireline damage of plastic coating, and is machined on standard two-step upsets. Standard RTS design features are incorporated, providing full pressure and tension ratings.

ENERPRO International, Inc.

RSU-8

Type: Upset	Seal: Metal-to-metal						J-55	L-80	N-80	P-110
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb			
1.250	2.4	1.300	1.898	1.858	0.669	0.578	4-5	6-75	6-75	6-75
1.500	2.9	1.530	2.134	2.094	0.799	0.667	6-75	8-10	8-10	8-10
2.063	3.3	1.700	2.325	2.300	0.935	0.886	7-875	9-112	9-112	9-112
2.375	4.7	1.945	2.700	2.630	1.304	1.228	1.1-1.375	1.5-1.87	1.57-1.87	1.57-1.87
2.875	6.5	2.375	3.220	3.155	1.812	1.597	1.5-1.87	2.1-2.62	2.1-2.62	2.1-2.62
3.500	9.3	2.920	3.905	3.805	2.590	2.421	2.5-3.125	3.0-3.75	3.0-3.75	3.0-3.75
4.000	11.0	3.395	4.450	4.315	3.077	2.287	3.0-3.75	3.5-4.37	3.5-4.37	3.5-4.37
4.500	12.8	3.865	4.910	4.825	3.600	3.256	3.5-4.37	4.5-5.62	4.5-5.62	4.5-5.62

ENERPRO International, Inc.

RTS-6

Type: Upset	Seal: Metal-to-metal						L-80	N-80	P-110
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb		
2.375	6.0	1.805	2.906	2.782	1.692	1.692	2.2-2.75	2.2-2.75	2.7-3.37
2.375	6.2	1.795	2.938	2.794	1.733	1.733	2.2-2.75	2.2-2.75	2.7-3.37
2.375	7.7	1.645	3.125	2.924	2.152	2.152	2.2-2.75	2.2-2.75	2.7-3.37
2.875	7.9	2.265	3.438	3.312	2.254	2.254	3.0-3.75	3.0-3.75	3.5-4.37
2.875	8.7	2.200	3.500	3.365	2.484	2.484	3.0-3.75	3.0-3.75	3.5-4.37
2.875	9.5	2.130	3.625	3.419	2.708	2.708	4.5-5.62	4.5-5.62	5.5-6.87
2.875	10.7	2.030	3.688	3.509	3.058	3.058	4.5-5.62	4.5-5.62	5.5-6.87
3.500	13.0	2.687	4.313	4.189	3.682	3.682	5.5-6.87	5.5-6.87	7.0-8.75
3.500	15.8	2.485	4.500	4.367	4.522	4.522	5.5-6.87	5.5-6.87	7.0-8.75
4.000	13.4	3.275	4.625	4.514	3.805	3.805	5.5-6.87	5.5-6.87	7.0-8.75
4.500	15.5	3.765	5.125	5.021	4.407	4.407	6.0-7.5	6.0-7.5	7.5-9.37
4.500	19.2	3.560	5.313	5.170	5.498	5.498	7.5-9.37	7.5-9.37	9.5-11.87

Enerpro International, Inc.

RTS-8

Type: Upset	Seal: Metal-to-metal						J-55	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb		
1.000	1.8	0.970	1.552	1.525	0.494	0.494	3-375	4-5	4-5
1.000	2.3	0.864	1.600	...	0.639	0.639	3-375	4-5	4-5
1.250	2.4	1.312	1.883	1.858	0.669	0.669	4-5	6-75	6-75
1.250	3.0	1.218	1.927	...	0.881	0.881	4-5	6-75	6-75
1.250	3.2	1.200	1.927	...	0.909	0.909	4-5	6-75	6-75
1.500	2.9	1.530	2.113	2.094	0.799	0.799	6-75	8-10	8-10
1.500	3.6	1.440	2.162	...	1.068	1.068	6-75	8-10	8-10
1.500	4.2	1.390	2.179	...	1.157	1.157	6-75	8-10	8-10
2.063	3.3	1.700	2.330	2.295	0.935	0.935	7-875	9-112	9-112
2.063	4.5	1.550	2.460	2.407	1.299	1.299	7-875	9-112	9-112
2.375	4.7	1.945	2.700	2.655	1.304	1.304	1.1-1.375	1.5-1.87	1.5-1.87
2.375	5.3	1.890	2.750	2.700	1.477	1.477	1.1-1.375	1.5-1.87	1.5-1.87
2.875	6.5	2.371	3.210	3.166	1.812	1.812	1.5-1.87	2.1-2.62	2.1-2.62
3.500	9.3	2.920	3.915	3.859	2.590	2.590	2.5-3.125	3.0-3.75	3.0-3.75
3.500	10.3	2.870	3.915	...	2.915	2.915	2.5-3.125	3.0-3.75	3.0-3.75
4.000	11.0	3.395	4.417	4.359	3.077	3.077	3.0-3.75	3.5-4.37	3.5-4.37
4.500	12.8	3.865	4.920	4.861	3.600	3.600	3.5-4.37	4.5-5.62	4.5-5.62
4.500	13.5	3.840	4.955	4.890	3.836	3.836	3.5-4.37	4.5-5.62	4.5-5.62

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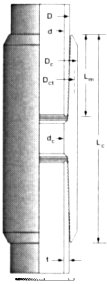
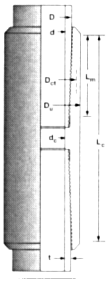
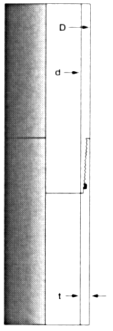
1996 Tubular Design Tables: Part I



GB ACME is a non-upset, high-torque, gas-tight connection, using proven Pittsburgh 8-Acme thread profile in a patented coupling body. Thread has positive 12° flank angles for easy stabbing and pulling. It uses thread interference seal s yet avoids localized plastic deformation common with positive type seals. Enhanced cross-section reinforces coupling center to avoid distortion under repeated make-up and loading and minimize thread galling. Threads are readily cut by field shops, and couplings can be special clearanced with no loss of pressure integrity.



GB ACME I.S. (Internal Shoulder) is a non-upset, high-torque, flush-ID, gas-tight connection using proven Pittsburgh 8-Acme thread profile in a patented coupling body. It features a thread interference seal and internal torque shoulders for positive make-up. Thread has 12° flank angles for easy stabbing and pulling resulting in superior make/break repeatability. Enhanced cross-section at center of coupling with thread interference seals avoids distortion under repeated make-up. It resists holidays and maintains coating integrity under repeated make/break and loading cycles. Threads are readily cut by field shops, and couplings can be made special clearance with no loss of pressure integrity. It is suitable for completions, workstrings and combination work/completion string applications.



GRANT PRIDECO/ATLAS BRADFORD FL-4S is a premium quality tubing and casing connection featuring Quadraseal design with metal-to-metal pin flank seal, trapped Teflon back-up seal, tapered modified buttress thread and external shoulder with trapping angle for exclusive four-way protection against leakage. It provides high joint strength, maximum running clearance, flush OD and optimum efficiency for every wall thickness.

ENERPRO International, Inc.

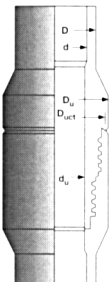
SB (Special Bore)

Type: Upset	Seal: Metal-to-metal						L/N-80	P-110
D	w	d/du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb	
2.375	4.7	1.995	2.700	....	1.304	1.304	1.1-1.3	1.3-1.6
2.375	5.3	1.939	2.750	....	1.477	1.477	1.5-1.8	1.5-1.8
2.375	6.0	1.867	2.906	....	1.692	1.692	1.9-2.3	2.6-3.2
2.375	6.2	1.853	2.938	....	1.733	1.733	2.1-2.6	2.7-3.3
2.375	7.7	1.703	3.125	....	2.152	2.152	2.2-2.7	2.7-3.3
2.875	6.5	2.441	3.210	....	1.812	1.812	1.7-2.1	2.1-2.6
2.875	7.9	2.323	3.438	....	2.254	2.254	3.0-3.7	3.5-4.3
2.875	8.7	2.259	3.500	....	2.484	2.484	3.0-3.7	3.5-4.3
2.875	9.5	2.195	3.625	....	2.708	2.708	4.5-5.6	5.5-6.8
2.875	10.7	2.091	3.688	....	3.058	3.058	4.5-5.6	5.5-6.8
3.500	9.3	2.992	3.915	....	2.590	2.590	3.0-3.7	3.0-3.7
3.500	10.3	2.922	3.915	....	2.915	2.915	3.0-3.7	3.0-3.7
3.500	13.0	2.750	4.313	....	3.682	3.682	5.5-6.8	7.0-8.7
3.500	15.8	2.548	4.500	....	4.522	4.522	5.5-6.8	7.0-8.7
4.000	11.0	3.476	4.417	....	3.077	3.077	3.5-4.3	3.5-4.3
4.000	13.4	3.340	4.625	....	3.805	3.805	4.5-5.6	5.6-7.0
4.500	12.8	3.958	4.920	....	3.600	3.600	4.5-5.6	4.5-5.6
4.500	13.5	3.920	4.955	....	3.836	3.836	4.5-5.6	4.5-5.6
4.500	15.5	3.826	5.125	....	4.407	4.407	6.0-7.5	7.5-9.3
4.500	19.2	3.640	5.313	....	5.498	5.498	7.5-9.3	9.5-11.8
5.000	15.0	4.408	5.370	....	4.374	3.999	4.8-6.0	6.8-8.5
5.000	18.0	4.276	5.455	....	5.275	4.902	5.8-7.2	7.6-9.5
5.500	17.0	4.892	5.900	....	4.962	4.532	6.5-8.1	8.8-11.0
5.500	20.0	4.778	6.000	....	5.828	5.400	7.0-8.7	9.2-11.5
5.500	23.0	4.670	6.035	....	6.630	6.203	7.4-9.2	9.6-12.0
7.000	23.0	6.366	7.444	....	6.656	6.029	11.7-14.6	16.7-20.8
7.000	26.0	6.276	7.444	....	7.549	6.924	12.0-15.0	17.0-21.2
7.000	29.0	6.184	7.572	....	8.449	7.826	15.0-18.7	21.5-26.8
7.000	32.0	6.094	7.580	....	9.317	8.695	15.6-19.5	22.0-27.5

GB Tubulars, Inc.

GB Acme and GB Acme I.S.

Type: Coupled, non-upset	Seal: Coupled, non-upset						J-55	L/N-80	P-110
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb		
2.375	4.6	1.901	2.875	2.700	1.304	2.473	3.0-4.0	3.0-4.0	3.0-4.0
2.375	5.8	1.773	2.875	2.700	1.692	2.473	....	3.0-4.0	3.0-4.0
2.875	6.4	2.347	3.500	3.220	1.812	3.630	3.5-4.5	3.5-4.5	3.5-4.5
2.875	7.9	2.229	3.500	3.220	2.254	3.630	....	3.5-4.5	3.5-4.5
2.875	8.6	2.165	3.500	3.220	2.484	3.630	....	3.5-4.5	3.5-4.5
3.500	9.2	2.867	4.250	3.865	2.590	5.176	4.0-5.0	4.0-5.0	4.0-5.0
3.500	10.2	2.797	4.250	3.865	2.915	5.176	....	4.0-5.0	4.0-5.0
3.500	12.7	2.625	4.250	3.865	3.682	5.176	....	4.0-5.0	4.0-5.0
4.500	12.6	3.833	5.200	4.920	3.600	6.122	6.0-10.0	6.0-10.0	6.0-10.0
4.500	15.2	3.701	5.200	4.920	4.407	6.122	....	6.0-10.0	6.0-10.0



GRANT PRIDECO/ATLAS BRADFORD ST-C/CST-C is an integral joint connection available in lighter tubing weights. It features a two-step, non-interference thread system, 14° metal pin nose pressure seal and external torque shoulder. It provides tension efficiencies exceeding 100% and excellent wear characteristics. Plastic coatable version available.

Grant Prideco

Atlas Bradford FL-4S

Type: Integral flush joint	Seal: Metal-to-metal, resilient						H-40	J/K-55	C-75	L/N-80	C-90	CT-95	P-110	Q-125	Grade140	V-150	Grade 155
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb										
2.375	4.7	1.926	2.375	n/a	1.304	0.531	4-5	4-5	4-5	5-6	5-6	5-6	55-65	55-65	55-65	55-65	55-65
2.375	6.0	1.823	2.375	n/a	1.692	0.877	4-5	4-5	4-5	5-6	5-6	5-6	6-7	6-7	6-7	6-7	6-7
2.875	6.5	2.372	2.875	n/a	1.812	0.751	6-7	6-7	6-7	8-9	8-9	8-9	8-10	8-10	8-10	8-10	8-10
2.875	7.9	2.279	2.875	n/a	2.254	1.175	6-7	6-7	6-7	8-9	8-9	8-9	8-10	8-10	8-10	8-10	8-10
3.500	7.7	2.968	3.500	n/a	2.228	0.927	1.0-1.2	1.0-1.2	1.0-1.2	1.1-1.3	1.1-1.3	1.1-1.3	1.15-1.35	1.15-1.35	1.15-1.35	1.15-1.35	1.15-1.35
3.500	9.3	2.917	3.500	n/a	2.590	1.343	1.0-1.2	1.0-1.2	1.0-1.2	1.4-1.6	1.4-1.6	1.4-1.6	1.6-1.8	1.6-1.8	1.6-1.8	1.6-1.8	1.6-1.8
3.500	10.3	2.847	3.500	n/a	2.915	1.458	1.0-1.2	1.0-1.2	1.0-1.2	1.4-1.6	1.4-1.6	1.4-1.6	1.6-1.8	1.6-1.8	1.6-1.8	1.6-1.8	1.6-1.8
3.500	13.0	2.675	3.500	n/a	3.682	2.312	1.2-1.4	1.2-1.4	1.2-1.4	1.5-1.7	1.5-1.7	1.5-1.7	1.7-1.9	1.7-1.9	1.7-1.9	1.7-1.9	1.7-1.9
4.000	9.5	3.448	4.000	n/a	2.680	1.111	1.1-1.4	1.1-1.4	1.1-1.4	1.3-1.5	1.3-1.5	1.3-1.5	1.4-1.6	1.4-1.6	1.4-1.6	1.4-1.6	1.4-1.6
4.000	11.0	3.401	4.000	n/a	3.077	1.615	1.2-1.5	1.2-1.5	1.2-1.5	1.4-1.6	1.4-1.6	1.4-1.6	1.4-1.75	1.4-1.75	1.4-1.75	1.4-1.75	1.4-1.75
4.000	11.6	3.353	4.000	n/a	3.337	1.746	1.3-1.6	1.3-1.6	1.3-1.6	1.6-1.9	1.6-1.8	1.6-1.9	2.2-2.6	2.2-2.6	2.2-2.6	2.2-2.6	2.2-2.6
4.500	9.5	3.990	4.500	n/a	2.766	1.136	1.8-2.3	1.8-2.3	1.8-2.3	1.8-2.3	1.8-2.3	1.8-2.3	1.8-2.4	1.8-2.4	1.8-2.4	1.8-2.4	1.8-2.4
4.500	10.5	3.952	4.500	n/a	3.009	1.253	1.8-2.3	1.8-2.3	1.8-2.3	1.8-2.3	1.8-2.3	1.8-2.3	1.8-2.4	1.8-2.4	1.8-2.4	1.8-2.4	1.8-2.4
4.500	11.0	3.926	4.500	n/a	3.174	1.327	1.8-2.3	1.8-2.3	1.8-2.3	2.2-2.8	2.2-2.8	2.2-2.8	2.3-3.0	2.3-3.0	2.3-3.0	2.3-3.0	2.3-3.0
4.500	11.6	3.925	4.500	n/a	3.338	1.729	2.1-2.6	2.1-2.6	2.1-2.6	2.2-2.9	2.2-2.9	2.2-2.9	2.3-3.1	2.3-3.1	2.3-3.1	2.3-3.1	2.3-3.1
4.500	12.8	3.883	4.500	n/a	3.600	1.879	2.1-2.6	2.1-2.6	2.1-2.6	2.2-3.0	2.2-3.0	2.2-3.0	2.4-3.3	2.4-3.3	2.4-3.3	2.4-3.3	2.4-3.3
4.500	13.5	3.845	4.500	n/a	3.836	2.012	....	....	2.3-3.1	2.3-3.1	2.3-3.1	2.3-3.1	2.8-3.4	2.8-3.4	2.8-3.4	2.8-3.4	2.8-3.4
5.000	11.5	4.460	5.000	n/a	3.304	1.370	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8
5.000	13.0	4.419	5.000	n/a	3.773	1.958	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8	1.2-1.8
5.000	15.0	4.333	5.000	n/a	4.374	2.298	3.0-3.6	3.0-3.6	3.0-3.6	3.0-3.9	3.0-3.9	3.0-3.9	3.6-4.3	3.6-4.3	3.6-4.3	3.6-4.3	3.6-4.3
5.000	18.0	4.201	5.000	n/a	5.275	3.310	3.0-3.6	3.0-3.6	3.0-3.6	3.1-3.7	3.1-3.7	3.1-3.7	3.6-4.3	3.6-4.3	3.6-4.3	3.6-4.3	3.6-4.3
5.500	14.0	4.912	5.500	n/a	4.029	1.676	1.9-2.4	1.9-2.4	1.9-2.4	1.9-2.5	1.9-2.5	1.9-2.5	1.9-2.5	1.9-2.5	1.9-2.5	1.9-2.5	1.9-2.5
5.500	15.5	4.875	5.500	n/a	4.514	2.356	2.3-2.7	2.3-2.7	2.3-2.7	2.8-3.4	2.8-3.4	2.8-3.4	3.1-3.6	3.1-3.6	3.1-3.6	3.1-3.6	3.1-3.6
5.500	17.0	4.817	5.500	n/a	4.962	2.607	2.4-2.9	2.4-2.9	2.4-2.9	3.0-3.6	3.0-3.6	3.0-3.6	4.0-4.6	4.0-4.6	4.0-4.6	4.0-4.6	4.0-4.6
5.500	20.0	4.703	5.500	n/a	5.828	3.669	....	....	....	3.4-4.1	3.4-4.1	3.4-4.1	4.4-5.2	4.4-5.2	4.4-5.2	4.4-5.2	4.4-5.2
5.500	23.0	4.595	5.500	n/a	6.630	4.193	....	....	....	4.4-5.2	4.4-5.2	4.4-5.2	4.6-5.6	4.6-5.6	4.6-5.6	4.6-5.6	4.6-5.6

Grant Prideco

Atlas Bradford ST-C/CST-C

Type: Upset	Seal: Metal-to-metal						H-40	J/K-55	C-75	L/N-80	C-90	CT-95	P-110	Q-125	Grade140	V-150	Grade 155
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb										
1.050	1.2	0.687	1.327	1.300	0.333	0.333	2-25	2-25	3-37	3-37	3-37	3-37	3-37	3-37	3-37	3-37	3-37
1.050	1.5	0.687	1.327	n/a	0.433	0.433	2-25	2-25	3-37	3-37	3-37	3-37	3-37	3-37	3-37	3-37	3-37
1.315	1.8	0.970	1.552	1.525	0.494	0.494	3-375	3-375	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5
1.315	2.3	0.864	1.600	n/a	0.639	0.639	3-375	3-375	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5
1.660	2.4	1.300	1.883	1.858	0.669	0.669	4-5	4-5	6-75	6-75	6-75	6-75	6-75	6-75	6-75	6-75	6-75
1.660	3.0	1.218	1.927	n/a	0.881	0.881	4-5	4-5	6-75	6-75	6-75	6-75	6-75	6-75	6-75	6-75	6-75
1.900	2.9	1.530	2.113	2.094	0.799	0.799	6-75	6-75	8-10	8-10	8-10	8-10	8-10	8-10	8-10	8-10	8-10
1.900	3.6	1.440	2.162	n/a	1.068	1.068	6-75	6-75	8-10	8-10	8-10	8-10	8-10	8-10	8-10	8-10	8-10
2.063	3.3	1.700	2.330	2.295	0.935	0.935	7-875	7-875	9-11	9-11	9-11	9-11	9-11	9-11	9-11	9-11	9-11
2.063	4.5	1.550	2.460	2.407	1.299	1.299	7-875	7-875	9-11	9-11	9-11	9-11	9-11	9-11	9-11	9-11	9-11

Continued

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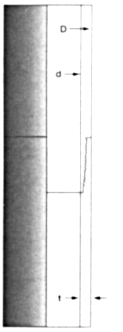
Atlas Bradford ST-C (continued)

Type: Upset	Seal: Metal-to-metal						H-40	J/K-55	C-75	L/N-80	C-90	CT-95	P-110	Q-125	Grade140	V-150	Grade 155
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb										
2.375	4.7	1.945	2.700	2.655	1.304	1.304	1.1-1.375	1.1-1.375	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9
2.375	5.3	1.890	2.750	2.700	1.477	1.477	1.1-1.375	1.1-1.375	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9
2.875	6.5	2.371	3.210	3.166	1.812	1.812	1.5-1.875	1.5-1.875	2.1-2.6	2.1-2.6	2.1-2.6	2.1-2.6	2.1-2.6	2.1-2.6	2.1-2.6	2.1-2.6	2.1-2.6
3.500	9.3	2.920	3.915	3.859	2.590	2.590	2.5-3.125	2.5-3.125	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8
3.500	10.3	2.870	3.915	3.914	2.915	2.915	2.5-3.125	2.5-3.125	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8
4.000	11.0	3.395	4.417	4.359	3.077	3.077	3.0-3.75	3.0-3.75	3.5-4.4	3.5-4.4	3.5-4.4	3.5-4.4	3.5-4.4	3.5-4.4	3.5-4.4	3.5-4.4	3.5-4.4
4.500	12.8	3.865	4.920	4.861	3.600	3.600	3.5-4.375	3.5-4.375	4.5-5.6	4.5-5.6	4.5-5.6	4.5-5.6	4.5-5.6	4.5-5.6	4.5-5.6	4.5-5.6	4.5-5.6
4.500	13.5	3.840	4.955	4.890	3.836	3.836	3.5-4.375	3.5-4.375	4.5-5.6	4.5-5.6	4.5-5.6	4.5-5.6	4.5-5.6	4.5-5.6	4.5-5.6	4.5-5.6	4.5-5.6

Grant Prideco — Atlas Bradford ST-L

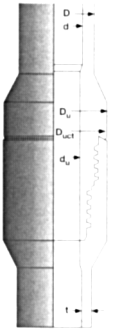
Type: Integral flush joint	Seal: Metal-to-metal optional resilient						H-40	J/K-55	C-75	L/N-80	C-90	C/T-95	P-110	Q-125	Grade140	V-150 Grade 155
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb									
2.375	4.7	1.920	2.375	n/a	1.304	0.575	.4-.6	.4-.6	.4-.6	5-.7	5-.7	5-.7	5-.7	5-.7	5-.7	5-.7
2.375	6.0	1.789	2.375	n/a	1.692	0.903	.6-.8	.6-.8	.6-.8	.8-1.0	.8-1.0	.8-1.0	.8-1.0	.8-1.0	.8-1.0	.8-1.0
2.875	6.5	2.377	2.875	n/a	1.812	0.892	.6-.8	.6-.8	.6-.8	.8-1.0	.8-1.0	.8-1.0	.8-1.0	.8-1.0	.8-1.0	.8-1.0
2.875	7.9	2.247	2.875	n/a	2.254	1.243	.8-1.0	.8-1.0	.8-1.0	1.0-1.4	1.0-1.4	1.0-1.4	1.0-1.4	1.0-1.4	1.0-1.4	1.0-1.4
2.875	8.7	2.196	2.875	n/a	2.484	1.408	1.0-1.2	1.0-1.2	1.0-1.2	1.1-1.5	1.1-1.5	1.1-1.5	1.1-1.5	1.1-1.5	1.1-1.5	1.1-1.5
3.500	7.6	2.968	3.500	n/a	2.228											
3.500	9.3	2.992	3.500	n/a	2.590	1.295	1.05-1.35	1.05-1.35	1.05-1.35	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8
3.500	10.3	2.845	3.500	n/a	2.915	1.643	1.05-1.35	1.05-1.35	1.05-1.35	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8
3.500	13.0	2.652	3.500	n/a	3.682	2.380	1.6-2.0	1.6-2.0	1.6-2.0	2.0-2.6	2.0-2.6	2.0-2.6	2.0-2.6	2.0-2.6	2.0-2.6	2.0-2.6
3.500	15.8	2.489	3.500	n/a	4.522	3.015	2.0-2.6	2.0-2.6	2.0-2.6	2.5-3.3	2.5-3.3	2.5-3.3	2.5-3.3	2.5-3.3	2.5-3.3	2.5-3.3
4.000	9.5	3.468	4.000	n/a	2.680	1.259	1.0-1.2	1.0-1.2	1.0-1.2	1.2-1.6	1.2-1.6	1.2-1.6	1.2-1.6	1.2-1.6	1.2-1.6	1.2-1.6
4.000	11.0	3.387	4.000	n/a	3.077	1.696	1.15-1.45	1.15-1.45	1.15-1.45	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8
4.000	11.6	3.347	4.000	n/a	3.337	1.885	1.2-1.6	1.2-1.6	1.2-1.6	1.6-2.0	1.6-2.0	1.6-2.0	1.6-2.0	1.6-2.0	1.6-2.0	1.6-2.0
4.000	13.4	3.274	4.000	n/a	3.805	2.223	1.45-1.9	1.45-1.9	1.45-1.9	1.8-2.4	1.8-2.4	1.8-2.4	1.8-2.4	1.8-2.4	1.8-2.4	1.8-2.4
4.500	9.5	4.010	4.500	n/a	2.766	1.345	9-1.1	9-1.1	9-1.1	1.1-1.5	1.1-1.5	1.1-1.5	1.1-1.5	1.1-1.5	1.1-1.5	1.1-1.5
4.500	10.5	3.952	4.500	n/a	3.009	1.460	.95-1.25	.95-1.25	9-1.25	1.2-1.6	1.2-1.6	1.2-1.6	1.2-1.6	1.2-1.6	1.2-1.6	1.2-1.6
4.500	11.0	3.944	4.500	n/a	3.174	1.698	1.15-1.45	1.15-1.45	1.15-1.45	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8	1.4-1.8
4.500	11.6	3.930	4.500	n/a	3.338	1.762	1.15-1.45	1.15-1.45	1.15-1.45	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9	1.5-1.9
4.500	12.8	3.886	4.500	n/a	3.600	2.011	1.3-1.7	1.3-1.7	1.3-1.7	1.7-2.1	1.7-2.1	1.7-2.1	1.7-2.1	1.7-2.1	1.7-2.1	1.7-2.1
4.500	13.5	3.854	4.500	n/a	3.836	2.181	1.4-1.8	1.4-1.8	1.4-1.8	1.8-2.4	1.8-2.4	1.8-2.4	1.8-2.4	1.8-2.4	1.8-2.4	1.8-2.4
4.500	15.1	3.776	4.500	n/a	4.407	2.597	1.7-2.1	1.7-2.1	1.7-2.1	2.2-2.8	2.2-2.8	2.2-2.8	2.2-2.8	2.2-2.8	2.2-2.8	2.2-2.8



GRANT PRIDECO/ATLAS BRADFORD ST-L is a flush OD premium tubing connection featuring negative-angle load flanks and twin lead threads to provide superior strength. Radial metal-to-metal seals and optional seal ring provide protection against internal and external pressures. Trapped 15° external torque shoulder withstands high make-up torque. Designed for easy stabbing and fast make-up.

Grant Prideco — Atlas Bradford ST-P/CST-P

Type: Upset	Seal: Metal-to-metal						H-40	J/K-55	C-75	L/N-80	C-90	C/T-95	P-110	Q-125	Grade140	V-150	Grade 155
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb										
2.375	6.0	1.805	2.906	2.782	1.692	1.692	....	....	2.2-2.8	2.2-2.8	2.2-2.8	2.2-2.8	2.7-3.4	2.7-3.4	2.7-3.4	2.7-3.4	2.7-3.4
2.375	6.2	1.795	2.938	2.794	1.733	1.733	....	....	2.2-2.8	2.2-2.8	2.2-2.8	2.2-2.8	2.7-3.4	2.7-3.4	2.7-3.4	2.7-3.4	2.7-3.4
2.375	7.7	1.645	3.125	3.002	2.152	2.152	....	....	2.2-2.8	2.2-2.8	2.2-2.8	2.2-2.8	2.7-3.4	2.7-3.4	2.7-3.4	2.7-3.4	2.7-3.4
2.875	7.9	2.265	3.438	3.312	2.254	2.254	....	....	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8	3.5-4.4	3.5-4.4	3.5-4.4	3.5-4.4	3.5-4.4
2.875	8.7	2.200	3.500	3.365	2.484	2.484	....	....	3.0-3.8	3.0-3.8	3.0-3.8	3.0-3.8	3.5-4.4	3.5-4.4	3.5-4.4	3.5-4.4	3.5-4.4
2.875	9.5	2.130	3.625	3.419	2.708	2.708	....	....	4.5-5.8	4.5-5.8	4.5-5.8	4.5-5.8	5.5-6.9	5.5-6.9	5.5-6.9	5.5-6.9	5.5-6.9
3.500	13.0	2.687	4.313	4.189	3.682	3.682	....	....	5.5-6.9	5.5-6.9	5.5-6.9	5.5-6.9	7.0-8.8	7.0-8.8	7.0-8.8	7.0-8.8	7.0-8.8
3.500	15.8	2.485	4.500	4.474	4.522	4.522	....	....	5.5-6.9	5.5-6.9	5.5-6.9	5.5-6.9	7.0-8.8	7.0-8.8	7.0-8.8	7.0-8.8	7.0-8.8
4.000	13.4	3.275	4.625	4.514	3.805	3.805	....	....	5.5-6.9	5.5-6.9	5.5-6.9	5.5-6.9	7.0-8.8	7.0-8.8	7.0-8.8	7.0-8.8	7.0-8.8
4.500	15.5	3.765	5.125	5.021	4.407	4.407	....	....	6.0-7.5	6.0-7.5	6.0-7.5	6.0-7.5	7.5-9.4	7.5-9.4	7.5-9.4	7.5-9.4	7.5-9.4
4.500	19.2	3.560	5.313	5.170	5.498	5.498	....	....	7.5-9.4	7.5-9.4	7.5-9.4	7.5-9.4	9.5-11.87	9.5-11.87	9.5-11.87	9.5-11.87	9.5-11.87



GRANT PRIDECO/ATLAS BRADFORD ST-P/CST-P is an integral joint connection available on medium to heavy-weight tubes. It features a two-step, non-interference thread system. 14° metal pin nose pressure seal and external torque shoulder. Tension efficiencies exceed 100%. Plastic coatable version available.

Grant Prideco — Atlas Bradford TC-4S

Type: Coupled	Seal: Metal-to-metal, resilient						H-40	J/K-55	C-75	L/N-80	C-90	C/T-95	P-110	Q-125	Grade140	V-150	Grade 155
D	w	d/du	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb										
2.375	4.7	1.995	2.750	1.289	1.304	1.304	....	....	....	1.2-1.3	1.2-1.3	1.2-1.3	1.2-1.3	....	....	....	....
2.375	5.3	1.939	2.750	1.371	1.477	1.477	....	....	....	1.5-1.75	1.5-1.75	1.5-1.75	1.5-1.75	....	....	....	....
2.375	6.0	1.867	2.800	1.468	1.692	1.692	....	....	....	1.8-1.94	1.8-1.94	1.8-1.94	1.8-1.94	....	....	....	....
2.375	6.2	1.853	2.800	1.486	1.733	1.733	....	....	....	1.8-2.1	1.8-2.1	1.8-2.1	1.8-2.1	....	....	....	....
2.375	7.7	1.703	2.900	1.655	2.152	2.152	....	....	....	1.9-2.2	1.9-2.2	1.9-2.2	1.9-2.2	....	....	....	....
2.875	6.5	2.441	3.250	1.519	1.812	1.812	....	....	....	1.4-1.65	1.4-1.65	1.4-1.65	1.4-1.65	....	....	....	....
2.875	7.9	2.323	3.375	1.694	2.254	2.254	....	....	....	2.0-2.3	2.0-2.3	2.0-2.3	2.0-2.3	....	....	....	....
2.875	8.7	2.259	3.375	1.778	2.484	2.484	....	....	....	2.4-2.8	2.4-2.8	2.4-2.8	2.4-2.8	....	....	....	....
2.875	9.5	2.195	3.450	1.857	2.708	2.708	....	....	....	2.4-2.8	2.4-2.8	2.4-2.8	2.4-2.8	....	....	....	....
2.875	11.0	2.065	3.500	2.000	3.143	3.143	....	....	....	2.8-3.25	2.8-3.25	2.8-3.25	2.8-3.25	....	....	....	....
2.875	11.7	1.995	3.550	2.070	3.366	3.366	....	....	....	3.0-3.5	3.0-3.5	3.0-3.5	3.0-3.5	....	....	....	....
3.500	9.3	2.992	3.950	1.816	2.590	2.590	....	....	....	2.1-2.27	2.1-2.27	2.1-2.27	2.1-2.27	....	....	....	....
3.500	10.3	2.922	3.950	1.927	2.915	2.915	....	....	....	2.6-3.05	2.6-3.05	2.6-3.05	2.6-3.05	....	....	....	....
3.500	13.0	2.750	4.100	2.165	3.682	3.682	....	....	....	3.4-3.95	3.4-3.95	3.4-3.95	3.4-3.95	....	....	....	....
3.500	15.8	2.548	4.200	2.400	4.522	4.522	....	....	....	4.0-4.65	4.0-4.65	4.0-4.65	4.0-4.65	....	....	....	....
3.500	16.7	2.480	4.250	2.470	4.791	4.791	....	....	....	4.0-4.65	4.0-4.65	4.0-4.65	4.0-4.65	....	....	....	....
3.500	17.1	2.440	4.300	2.509	4.945	4.945	....	....	....	4.0-4.65	4.0-4.65	4.0-4.65	4.0-4.65	....	....	....	....
4.000	11.0	3.476	4.450	1.979	3.077	3.077	....	....	....	2.3-2.7	2.3-2.7	2.3-2.7	2.3-2.7	....	....	....	....
4.000	13.4	3.340	4.525	2.201	3.805	3.805	....	....	....	3.6-3.89	3.6-3.89	3.6-3.89	3.6-3.89	....	....	....	....
4.000	19.0	3.000	4.800	2.646	5.498	5.498	....	....	....	5.5-5.94	5.5-5.94	5.5-5.94	5.5-5.94	....	....	....	....
4.500	12.8	3.958	4.950	2.141	3.600	3.600	....	....	....	3.6-3.89	3.6-3.89	3.6-3.89	3.6-3.89	....	....	....	....
4.500	13.5	3.920	4.950	2.210	3.836	3.836	....	....	....	4.0-4.32	4.0-4.32	4.0-4.32	4.0-4.32	....	....	....	....
4.500	15.5	3.826	5.100	2.369	4.407	4.407	....	....	....	4.2-4.54	4.2-4.54	4.2-4.54	4.2-4.54	....	....	....	....
4.500	16.9	3.754	5.100	2.481	4.836	4.836	....	....	....	4.8-5.18	4.8-5.18	4.8-5.18	4.8-5.18	....	....	....	....
4.500	19.2	3.640	5.200	2.646	5.498	5.498	....	....	....	5.8-6.26	5.8-6.26	5.8-6.26	5.8-6.26	....	....	....	....
4.500	21.6	3.500	5.300	2.828	6.283	6.283	....	....	....	6.0-6.48	6.0-6.48	6.0-6.48	6.0-6.48	....	....	....	....

Grant Prideco — Atlas Bradford TC-II

Type: Coupled	Seal: Metal-to-metal, optional resilient						H-40	J/K-55	C-75	L/N-80	C-90	C/T-95	P-110	Q-125	Grade140	V-150	Grade 155
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb										
2.375	4.6	1.995	2.675	n/a	1.304	1.304	....	....	....	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375
2.375	5.1	1.939	2.716	n/a	1.477	1.477	....	....	....	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375
2.375	5.8	1.867	2.766	n/a	1.692	1.692	....	....	....	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375	1.9-2.375
2.875	6.4	2.441	3.211	n/a	1.812	1.812	....	....	....	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875
2.875	7.7	2.323	3.297	n/a	2.254	2.254	....	....	....	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875
2.875	8.6	2.259	3.342	n/a	2.484	2.484	....	....	....	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875	2.3-2.875

Continued

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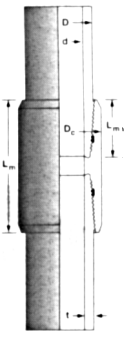
Atlas Bradford TC-II (continued)

Type: Coupled	Seal: Metal-to-metal, optional resilient					H-40	J/K-55	C-75	L/N-80	C-90	C/T-95	P-110	Q-125	Grade140	V-150	Grade 155
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb									
3.500	7.7	3.068*	3.827	n/a	2.228	2.228	....	....	....	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5
3.500	9.2	2.992	3.887	n/a	2.590	2.590	....	....	....	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5
3.500	10.2	2.922	3.940	n/a	2.915	2.915	....	....	....	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5
3.500	12.7	2.750	4.062	n/a	3.682	3.682	....	....	....	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5	2.8-3.5
4.000	9.5	3.548*	4.356	n/a	2.680	2.680	....	....	....	3.2-4.0	3.2-4.0	3.2-4.0	3.2-4.0	3.2-4.0	3.2-4.0	3.2-4.0
4.000	10.9	3.476	4.414	n/a	3.077	3.077	....	....	....	3.2-4.0	3.2-4.0	3.2-4.0	3.2-4.0	3.2-4.0	3.2-4.0	3.2-4.0
4.000	13.0	3.340	4.518	n/a	3.805	3.805	....	....	....	3.2-4.0	3.2-4.0	3.2-4.0	3.2-4.0	3.2-4.0	3.2-4.0	3.2-4.0
4.500	10.5	4.052	4.855	n/a	3.008	3.008	....	....	....	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5
4.500	11.6	4.000	4.898	n/a	3.338	3.338	....	....	....	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5
4.500	12.8	3.958	4.932	n/a	3.600	3.600	....	....	....	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5
4.500	13.5	3.920	4.962	n/a	3.836	3.836	....	....	....	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5
4.500	15.1	3.826	5.035	n/a	4.407	4.407	....	....	....	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5	3.6-4.5

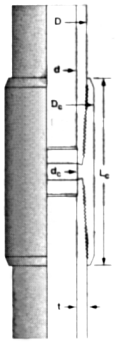
* du value is less than or equal to the d value.



GRANT PRIDECO/ATLAS BRAD-FORD TC-4S is a high integrity connection that uses the Quadraseal system. Initial seal is a 15° reversed angle torque shoulder backed-up by metal-to-metal pin flank and a back of box seal that forms a second mechanical seal. Patented thread entrapped Teflon ring forms a third barrier. Modified buttress thread for easy stabbing, fast make-up and built-in resistance to back off forms the fourth multiple seal system member.

Halliburton Energy Services — OECO "A"

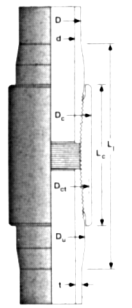
Type: Integral Seal: Metal-to-metal							J-55	C-75	L/N-80	C-90	C/T-95	P-110
D	w	d	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb					
1.315	1.8	0.955	1.552	1.525	0.494	0.574	0.2	0.4	0.4	0.4	0.4	0.4
1.315	2.3	0.863	1.600	n/a	0.639	0.727	0.2	0.4	0.4	0.4	0.4	0.4
1.660	2.4	1.286	1.883	1.858	0.669	0.717	0.5	0.7	0.7	0.7	0.7	0.7
1.660	3.0	1.184	1.927	n/a	0.881	0.904	0.5	0.7	0.7	0.7	0.7	0.7
1.660	3.2	1.170	1.927	n/a	0.909	0.938	0.5	0.7	0.7	0.7	0.7	0.7
1.900	2.9	1.516	2.113	2.094	0.799	0.861	0.7	0.9	0.9	0.9	0.9	0.9
1.900	3.6	1.406	2.162	n/a	1.068	1.071	0.7	0.9	0.9	0.9	0.9	0.9
1.900	4.2	1.368	2.179	n/a	1.157	1.182	0.7	0.9	0.9	0.9	0.9	0.9
2.063	3.3	1.657	2.330	2.295	0.935	1.012	0.8	1.0	1.0	1.0	1.0	1.0
2.063	4.5	1.519	2.460	2.407	1.299	1.394	0.8	1.0	1.0	1.0	1.0	1.0
2.375	4.7	1.901	2.700	2.655	1.304	1.377	1.2	1.7	1.7	1.7	1.7	1.7
2.375	5.3	1.845	2.750	2.700	1.477	1.543	1.2	1.7	1.7	1.7	1.7	1.7
2.875	6.5	2.347	3.210	3.166	1.812	1.848	1.7	2.3	2.3	2.3	2.3	2.3
3.500	9.3	2.867	3.915	3.859	2.590	2.744	2.8	3.3	3.3	3.4	3.4	3.4
3.500	10.3	2.797	3.980	3.914	2.915	2.971	2.8	3.3	3.3	3.4	3.4	3.4
4.500	12.8	3.833	4.920	4.861	3.600	3.792	3.8	5.0	5.0	5.0	5.0	5.0
4.500	13.5	3.795	4.955	4.890	3.836	3.944	3.8	5.0	5.0	5.0	5.0	5.0



GRANT PRIDECO/ATLAS BRAD-FORD TC-II is the latest generation premium threaded and coupled tubing and casing connection. Developed to replace the TC-4S, it features modified buttress tapered run-out thread, metal-to-metal internal radial flank seal, optional resilient Teflon seal ring as backup to primary metal-to-metal seal, 15° reverse internal torque shoulder, smooth ID bore and minimized coupling OD. Performance exceeds pipe body ratings in internal pressure, external pressure, tension and compression.

Halliburton Energy Services — OECO "C"

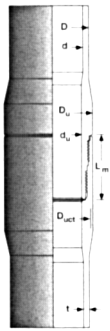
Type: Integral Seal: Metal-to-metal							C-75	L/N-80	C-90	C/T-95	P-110
D	w	d	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb				
2.375	6.0	1.773	2.906	2.782	1.692	1.868	2.5	2.5	2.9	2.9	2.9
2.375	6.2	1.759	2.938	2.794	1.733	1.896	2.5	2.5	2.9	2.9	2.9
2.375	7.7	1.609	3.125	3.002	2.152	2.301	2.5	2.5	2.9	2.9	2.9
2.875	7.9	2.229	3.438	3.312	2.254	2.458	3.5	3.5	4.0	4.0	4.0
2.875	8.7	2.165	3.500	3.365	2.484	2.686	3.5	3.5	4.0	4.0	4.0
2.875	9.5	2.101	3.625	3.419	2.708	2.924	5.1	5.1	6.3	6.3	6.3
2.875	10.7	1.997	3.688	3.595	3.058	3.251	5.1	5.1	6.3	6.3	6.3
3.500	13.0	2.625	4.313	4.189	3.682	4.401	5.9	5.9	7.9	7.9	7.9
3.500	15.8	2.423	4.500	4.367	4.522	5.222	5.9	5.9	7.9	7.9	7.9
4.000	13.4	3.215	4.625	4.514	3.805	4.111	6.2	6.2	7.8	7.8	7.8
4.500	15.5	3.701	5.125	5.021	4.407	4.722	6.5	6.5	8.1	8.1	8.1
4.500	19.2	3.515	5.313	*5.170	5.498	5.901	8.4	8.4	10.6	10.6	10.6



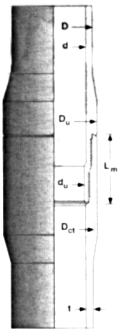
HUNTING INTERLOCK THREADMASTERS CONVERTIBLE for API casing and tubing pins is manufactured to the closest tolerances in industry. It can be upgraded by inserting a converter ring into coupling center to achieve pressure integrity equal to pipe body internal yield, precise make-up with mechanical torque stop shoulders and flush ID for smooth, turbulent-free flow.

Halliburton Energy Services — OECO "H"

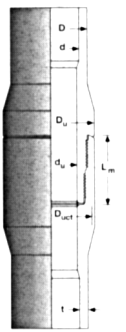
Type: Integral Seal: Metal-to-metal							J-55	C-75	L/N-80	C-90	C/T-95	P-110
D	w	d	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb					
1.660	2.4	1.286	1.878	1.858	0.669	0.573	0.5	0.7	0.7	0.7	0.7	0.7
1.900	2.9	1.516	2.114	2.094	0.799	0.664	0.7	0.9	0.9	0.9	0.9	0.9
2.063	3.3	1.657	2.305	2.295	0.935	0.873	0.8	1.0	1.0	1.0	1.0	1.0
2.375	4.7	1.901	2.655	2.630	1.304	1.223	1.2	1.7	1.7	1.7	1.7	1.7
2.875	6.5	2.347	3.165	3.155	1.812	1.584	1.7	2.3	2.3	2.3	2.3	2.3
3.500	9.3	2.867	3.843	3.805	2.590	2.410	2.8	3.3	3.3	3.4	3.4	3.4
4.500	12.8	3.833	4.850	4.825	3.600	3.221	3.8	5.0	5.0	5.0	5.0	5.0



HALLIBURTON OECO TYPE A is an integral joint, two-step straight thread connection with metal-to-metal pin flank seal and outer tapered shoulder that provides a seal and a make-up point. Straight thread design minimizes hoop stress, permitting fast make-up and break-out. OECO Type B is an identical connection with corrosion protection ring.



HALLIBURTON OECO TYPE H connection provides an integral joint, two-step threaded joint for less expensive upset end tubing. It is useful where a premium thread is needed, but economy is a primary factor and 100% efficiency is not. Type G provides corrosion protection ring.



HALLIBURTON OECO TYPE C thread is designed for medium weight pipe. It provides the same integral joint, sealing, fast make-break and over 100% efficiency as Type A, but the heavier make-up shoulder makes it especially suitable for workstrings and completions. Type D provides corrosion protection ring.

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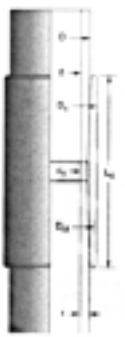
1996 Tubular Design Tables: Part I

HUNTING INTERLOCK THREADMASTERS CONVERTIBLE COUPLING WITH CONVERTER RING upgrades coupling for critical applications. Converter ring is press fit into "J" area of coupling and provides a smooth bore and positive torque stop that is ideal for workstring. With torque adjustment, to allow for sufficient bearing pressure, converter ring produces a metal-to-metal seal with pressure integrity in excess of pipe body in tubing sizes.

HUNTING INTERLOCK THREADMASTERS TKC 4040-CONVERTIBLE tubing connections provide superior durability in non-upset configuration. Converter ring is press-fit into J area of coupling and provides an internal torque stop and an axially loaded metal-to-metal seal.

HUNTING INTERLOCK THREADMASTERS TKC 4040-NU tubing connections provide durability in non-upset configuration. Three separate sealing mechanisms form internal pressure seals. Internal torque shoulder forms a positive torque stop on make-up and an axially loaded metal-to-metal seal. A glass-reinforced teflon seal forms second pressure barrier. Full contact thread form establishes a thread seal. Exterior pressure is restrained by an additional seal in coupling counterbore. Non-upset design allows it to also be used to reclaim premium tubulars that cannot be rethreaded.

HUNTING INTERLOCK THREADMASTERS FJ-150 features a proven thread form, internal axial metal-to-metal nose seal and external torque shoulder. Shallow taper, large stab flank radius, and roots/crests parallel to pipe axis provide deep stabbing and no cross-threading for easy make-up. Large torque shoulders allow high torque capabilities. Close fitting, low interference threads in conjunction with SealLube thread compound result in a rugged, leak free, ID/OD flush connection.



HUNTING INTERLOCK THREADMASTERS FS-150 is a non-upset connection. Low interference thread design and 90° load flank ensure very low hoop stress. Large radius stab flank allows easy make-up. Press fit metal ring provides smooth bore, positive positional make-up and metal-to-metal seal. Connection strength nears that of pipe body.

HUNTING INTERLOCK HD LOCK-IT is threaded and coupled on plain end, non-upset tubes. Special clearances are available. Tension strength, even hand tight, exceeds full pipe body yield strength of the for all sizes, weights and grades. Auxiliary resilient pressure seal rings are available. Low stress assemblies are suitable for corrosive environments. Negative load flank threads provide for operating loads to pipe body yield as a minimum.

Hunting Interlock, Inc.

Threadmasters Convertible WO Ring

Type: EUE, T&C		Seal: Thread					J-55	L/N-80	P-110
D	w	d	Du	Duct	At	Ac	"Delta Torque", 1,000 ft-lb		
2.375	4.7	1.995	3.063	2.910	1.304	1.594	0.97-1.61	1.35-2.85	1.70-2.84
2.375	6.0	1.867	3.063	2.910	1.692	1.982	.....	1.68-2.8	2.12-3.54
2.875	6.5	2.441	3.668	3.460	1.812	2.162	1.24-2.06	1.73-2.88	2.18-3.64
2.875	7.9	2.323	3.668	3.460	2.254	2.604	.....	2.08-3.47	2.63-4.38
2.875	8.7	2.259	3.668	3.460	2.484	2.834	.....	2.27-3.78	2.86-4.76
3.500	9.3	2.992	4.500	4.180	2.590	3.190	1.71-2.85	2.40-4.00	3.04-5.06
3.500	10.3	2.922	4.500	4.180	2.915	3.515	.....	.....	.....
3.500	13.0	2.750	4.500	4.180	3.682	4.282	.....	3.22-5.36	4.07-6.79
4.000	11.0	3.476	5.000	4.625	3.077	3.761	1.92-3.20	2.70-4.50	.....
4.500	12.8	3.958	5.563	5.125	3.600	4.369	2.15-3.58	3.02-5.03	.....

Hunting Interlock, Inc.

Threadmasters Convertible W/Ring

Type: EUE, T&C		Seal: Metal-to-metal, thread					J-55	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	"Delta Torque", 1,000 ft-lb		
2.375	4.7	1.975	3.063	2.910	1.304	1.594	0.57-1.35	0.82-1.96	1.08-2.70
2.375	6.0	1.847	3.063	2.910	1.692	1.982	.....	1.50-2.67	1.96-3.66
2.875	6.5	2.421	3.668	3.460	1.812	2.162	0.87-2.21	1.27-3.21	1.67-4.12
2.875	7.9	2.303	3.668	3.460	2.254	2.604	.....	1.97-3.91	2.76-5.73
2.875	8.7	2.239	3.668	3.460	2.484	2.834	.....	2.62-4.65	3.44-6.40
3.500	9.3	2.972	4.500	4.180	2.590	3.190	1.56-4.09	2.27-5.95	2.98-8.18
3.500	10.3	2.902	4.500	4.180	2.915	3.515	.....	.....	.....
3.500	13.0	2.730	4.500	4.180	3.682	4.282	.....	4.92-8.75	6.46-12.01
4.000	11.0	3.456	5.000	4.625	3.077	3.761	1.87-5.43	2.72-7.90	.....
4.500	12.8	3.936	5.563	5.125	3.600	4.369	2.22-7.02	3.23-10.21	.....

Hunting Interlock, Inc.

Threadmasters Convertible 4040

Type: NUE, T&C		Seal: Metal-to-metal, thread					J-55	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	"Delta Torque", 1,000 ft-lb		
2.375	4.6	1.975	2.875	2.688	1.304	1.230	0.32-0.76	0.46-1.1	0.61-1.51
2.375	5.8	1.847	2.875	2.688	1.692	1.618	.....	0.99-1.77	1.3-2.23
2.875	6.4	2.421	3.500	3.250	1.812	1.722	0.56-1.41	0.81-2.05	1.01-2.54
2.875	7.8	2.303	3.500	3.250	2.254	2.164	.....	1.49-2.95	2.04-4.05
2.875	8.6	2.239	3.500	3.250	2.484	2.394	.....	1.92-3.41	2.64-4.68
3.500	9.2	2.972	4.250	4.000	2.590	2.481	1.03-2.70	1.49-3.92	1.96-5.39
3.500	10.2	2.902	4.250	4.000	2.915	2.806	1.40-3.24	2.04-4.71	.....
3.500	12.7	2.730	4.250	4.000	3.682	3.572	.....	3.68-6.54	4.83-8.99
4.000	11.0	3.456	4.750	4.406	3.077	2.951	1.87-3.71	1.85-5.39	.....
4.500	12.6	3.938	5.200	4.938	3.600	3.459	1.57-4.95	2.28-7.20	.....

Hunting Interlock, Inc.

Threadmasters FJ-150

Type: Flush joint		Seal: Metal-to-metal, thread					J-55	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	"Delta Torque", 1,000 ft-lb		
2.375	4.6	1.920	2.375	.....	1.304	0.607	0.80-1.60	12.0-2.30	1.60-3.20
2.375	5.8	1.792	2.375	.....	1.692	0.846	1.30-2.50	1.80-3.60	2.50-5.00
2.875	6.4	2.366	2.875	.....	1.812	0.907	1.30-2.50	1.80-3.60	2.50-5.00
2.875	7.8	2.248	2.875	.....	2.254	1.207	1.70-3.30	2.40-4.70	3.30-6.50
2.875	8.6	2.184	2.875	.....	2.484	1.322	2.00-3.90	2.90-5.70	4.00-7.90
3.500	9.2	2.917	3.500	.....	2.590	1.290	2.10-4.10	3.00-6.00	4.20-8.30
3.500	10.2	2.847	3.500	.....	2.915	1.559	2.20-4.40	3.20-6.40	4.40-8.80
3.500	12.7	2.675	3.500	.....	3.682	1.938	3.40-6.70	4.90-9.70	6.70-13.30
4.000	9.5	3.473	4.000	.....	2.680	1.341	2.00-3.90	2.80-5.60	3.90-7.70
4.500	12.6	2.883	4.500	.....	3.600	1.792	3.00-6.00	4.40-8.70	6.00-12.00

Hunting Interlock, Inc.

Threadmasters FS-150

Type: NUE, T&C		Seal: Metal-to-metal, thread					J-55	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	Delta Torque", 1,000 ft-lb		
2.375	4.6	1.975	2.875	2.688	1.304	1.230	0.32-0.77	0.47-1.12	0.62-1.54
2.375	5.8	1.847	2.875	2.688	1.692	1.618	0.68-1.21	0.99-1.76	1.30-2.43
2.875	6.4	2.421	3.500	3.250	1.812	1.722	0.53-1.35	0.78-1.96	1.02-2.70
2.875	7.8	2.303	3.500	3.250	2.254	2.164	0.98-1.94	1.43-2.83	1.87-3.89
2.875	8.6	2.239	3.500	3.250	2.484	2.394	1.27-2.25	1.84-3.27	2.42-4.5
3.500	9.2	2.972	4.250	4.000	2.590	2.481	1.00-2.63	1.46-3.82	1.91-5.25
3.500	10.2	2.902	4.250	4.000	2.915	2.806	1.97-3.88	2.87-5.64	3.77-7.58
3.500	12.7	2.730	4.250	4.000	3.682	3.572	2.46-4.38	3.58-6.37	4.70-8.75
4.000	9.5	3.528	4.750	4.406	2.680	2.951	0.75-2.53	1.09-3.68	1.43-5.06
4.500	12.6	3.938	5.000	4.938	3.600	3.459	1.39-4.40	2.02-6.41	2.66-8.81

"Delta Torque" is torque applied to connection after shouldering. Contact Hunting Interlock Inc. Threadmasters for make-up torques.

Hunting Interlock, Inc.

HD LOCK-IT

Type: Coupled, non-upset		Seal: Metal-to-metal					J-55	L/N-80	P-110
D	w	d	Dc	Dct	At	Ac	Make-up torque,1,000 ft-lb		
2.375	4.7	1.995	2.875	2.690	.....	1.304	1000.0	1100.0	1100.0
2.375	5.3	1.939	2.875	2.731	.....	1.477	1200.0	1400.0	1600.0
2.375	6.0	1.867	2.875	2.781	.....	1.692	1200.0	1400.0	1600.0
2.375	6.2	1.853	2.875	2.791	.....	1.733	1200.0	1400.0	1600.0
2.875	6.5	2.441	3.500	3.225	.....	2.254	1200.0	1400.0	1600.0
2.875	7.9	2.323	3.500	3.312	.....	1.812	2100.0	2400.0	2900.0
2.875	8.7	2.259	3.500	3.356	.....	2.484	1600.0	1800.0	2200.0
3.500	9.3	2.992	4.250	3.896	.....	2.590	1800.0	2100.0	2300.0
3.500	10.3	2.922	4.250	3.949	.....	2.915	2100.0	2400.0	2900.0
3.500	13.0	2.750	4.250	4.071	.....	3.682	2400.0	2700.0	3100.0
4.000	9.5	3.548	4.750	4.354	.....	2.680	2400.0	2800.0	3200.0
4.000	11.0	3.476	4.750	4.412	.....	3.077	2400.0	2800.0	3500.0
4.000	11.6	3.428	4.750	4.449	.....	3.337	2700.0	3100.0	3500.0
4.000	13.4	3.340	4.750	4.516	.....	3.805	3200.0	3600.0	4100.0
4.500	11.0	4.026	5.000	4.858	.....	3.174	3000.0	3500.0	4000.0
4.500	11.6	4.000	5.000	4.879	.....	3.338	3000.0	3500.0	4000.0
4.500	12.6	3.958	5.000	4.914	.....	3.600	3200.0	3700.0	4200.0
4.500	13.5	3.920	5.000	4.944	.....	3.836	3500.0	4000.0	4500.0
4.500	15.1	3.826	5.000	5.000	.....	4.389	4000.0	4500.0	5000.0

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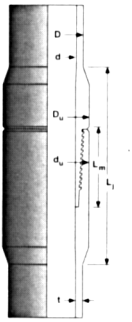
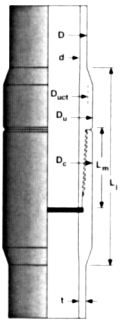
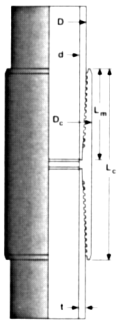
1996 Tubular Design Tables: Part I



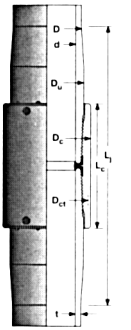
HUNTING INTERLOCK I-J NU-LOCK is an integral connection with high joint strength, rugged internal and external torque shoulders and leak-resistant metal-to-metal seal. Negative flank, low-profile thread design provides fast make-up capability while resisting thread pull-out and cross-threading. Turned OD and flush ID in all tubing weights make it suitable for corrosive service and multiple completions.



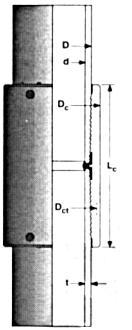
HUNTING INTERLOCK I-J NU-LOCK PC is an integral connection for plastic coated applications requiring high joint strength, positive torque stop and metal-to-metal sealing. Negative flank, low-profile thread design provides fast make-up capability while resisting thread pull-out and cross-threading. Turned OD and flush ID in all tubing weights make it suitable for corrosive service and multiple completions. Elastomeric ring at an internal shoulder is suitable for use in highly corrosive fluids or gases.



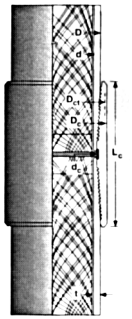
HUNTING INTERLOCK LOCK-IT-EIGHT is an economical plain end, non-upset threaded and coupled connection for light weights of 1.5 through 3.5-in. pipe. Hooked threads and gas-tight metal-to-metal seal provide tensile and internal pressure ratings equal to pipe body yield. Clearance coupling diameters are standard.



HUNTING INTERLOCK THREADMASTERS TKC MMS is a holiday-free, internal flush tubing connection when used in conjunction with properly coated API EUE pipe. Applications with severe corrosion such as wet CO_2 injection and disposal wells benefit most. It combines a proprietary coupling and gauging system to precisely assemble connections, which reduces average compressive stresses in pin and allows use of a polymeric center seal to bridge coated pin surfaces. This seal has been proven to withstand repeated make/break.



HUNTING INTERLOCK THREADMASTERS TKC 4040-MMS connection is designed for non-upset tubing in highly corrosive environments. It is internally flush and holiday-free when used with properly coated tubing. It has application in wet CO_2 and disposal applications where other connections fail prematurely. It can be applied to used tubulars regardless of previous end finish. Center ring creates an internally flush surface and bridges the two pin ends with non-corrosive material that can withstand repeated make/break.



HUNTING INTERLOCK SEAL-LOCK FGL combines performance and pressure integrity of metal-to-metal sealing with corrosion resistance of fiberglass lining. This plain end threaded and coupled connection is mated with Rice Engineering's DUOLINE liner for unsurpassed performance in CO_2 injection/prodution applications.

Hunting Interlock, Inc. — I-J NU-LOCK

Type: Upset, integral		Seal: Metal-to-metal					J-55	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	Make-up torque,1,000 ft-lb		
2.375	4.7	1.948	2.700	....	....	....	1500.0	1500.0	1500.0
2.375	5.3	1.892	2.750	....	....	....	1500.0	1500.0	1500.0
2.375	6.0	1.820	2.800	....	....	....	1500.0	1500.0	1500.0
2.875	6.5	2.394	3.220	....	....	....	2000.0	2000.0	2000.0
2.875	7.9	2.276	3.375	....	....	....	2000.0	2000.0	2000.0
2.875	8.7	2.212	3.375	....	....	....	2000.0	2000.0	2000.0
2.875	9.5	2.148	3.450	....	....	....	2000.0	2000.0	2000.0
2.875	11.0	2.018	3.500	....	....	....	2000.0	2000.0	2000.0
2.875	11.7	1.948	3.500	....	....	....	2000.0	2000.0	2000.0
3.500	9.3	2.927	3.900	....	....	....	2500.0	2500.0	2500.0
3.500	10.3	2.857	3.950	....	....	....	2500.0	2500.0	2500.0
3.500	15.8	2.483	4.250	....	....	....	2500.0	2500.0	2500.0
3.500	16.7	2.415	4.250	....	....	....	2500.0	2500.0	2500.0

Hunting Interlock, Inc. — I-J NU-LOCK PC

Type: Integral		Seal: Metal-to-metal, resilient					J-55	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	Make-up torque,1,000 ft-lb		
2.375	4.7	1.948	2.700	....	....	....	1500.0	1500.0	1500.0
2.375	5.3	1.892	2.750	....	....	....	1500.0	1500.0	1500.0
2.375	6.0	1.820	2.800	....	....	....	1500.0	1500.0	1500.0
2.875	6.5	2.394	3.220	....	....	....	2000.0	2000.0	1500.0
2.875	7.9	2.276	3.375	....	....	....	2000.0	2000.0	1500.0
2.875	8.7	2.120	3.375	....	....	....	2000.0	2000.0	2000.0
2.875	9.5	2.148	3.450	....	....	....	2000.0	2000.0	2000.0
2.875	11.0	2.018	3.500	....	....	....	2000.0	2000.0	2000.0
2.875	11.7	1.948	3.500	....	....	....	2000.0	2000.0	2000.0
3.500	9.3	2.927	3.900	....	....	....	2500.0	2500.0	2500.0
3.500	10.3	2.857	3.950	....	....	....	2500.0	2500.0	2500.0
3.500	13.0	2.685	4.250	....	....	....	2500.0	2500.0	2500.0
3.500	15.8	2.483	4.250	....	....	....	2500.0	2500.0	2500.0
3.500	16.7	2.415	4.250	....	....	....	2500.0	2500.0	2500.0

Hunting Interlock, Inc. — LOCK-IT-EIGHT

Type: Coupled, non-upset		Seal: Metal-to-metal					J-55	L/N-80	P-110
D	w	du	Dc	Dct	At	Ac	Make-up torque,1,000 ft-lb		
1.900	2.9	1.556	2.250	....	....	1.230	700.0	800.0	900.0
2.063	3.3	1.721	2.450	....	....	1.443	800.0	900.0	900.0
2.375	4.6	1.965	2.720	....	....	1.481	1400.0	1600.0	1700.0
2.875	6.4	2.411	3.260	....	....	2.057	1600.0	1900.0	2100.0
3.500	9.2	2.962	3.935	....	....	2.932	2100.0	2400.0	2600.0
4.000	11.0	3.446	4.625	....	....	4.793	2800.0	3400.0	3600.0
4.500	12.6	3.928	4.950	....	....	4.053	3400.0	4000.0	4300.0

Hunting Interlock, Inc. — Threadmasters TKC MMS

Type: EUE, T&C		Seal: Thread, elastomeric					J-55	L/N-80	P-110
D	w	d/du	Du	Duct	At	Ac	Mill and field end makeup is positional		
2.375	4.7	1.995	3.063	2.910	1.304	1.594	....	....	....
2.375	6.0	1.867	3.063	2.910	1.692	1.982	....	....	....
2.875	6.5	2.441	3.668	3.460	1.812	2.162	....	....	....
2.875	7.9	2.323	3.668	3.460	2.254	2.604	....	....	....
2.875	8.7	2.259	3.668	3.460	2.484	2.834	....	....	....
3.500	9.3	2.992	4.500	4.180	2.590	3.190	....	....	....
3.500	10.3	2.922	4.500	4.180	2.915	3.515	....	....	....
3.500	13.0	2.750	4.500	4.180	3.682	4.282	....	....	....
4.000	11.0	3.476	5.000	4.625	3.077	3.761	....	....	....
4.500	12.8	3.958	5.563	5.125	3.600	4.369	....	....	....

Hunting Interlock, Inc. — Threadmasters TKC MMS 4040

Type: NUE, T&C		Seal: Thread, elastomeric					J-55	L/N-80	P-110
D	w	d/du	Du	Duct	At	Ac	Mill and field end makeup is positional		
2.375	4.6	1.995	2.875	2.742	1.304	1.230	....	....	....
2.375	5.8	1.867	2.875	2.742	1.692	1.618	....	....	....
2.875	6.4	2.441	3.500	3.291	1.812	1.722	....	....	....
2.875	7.8	2.323	3.500	3.291	2.254	2.164	....	....	....
2.875	8.6	2.259	3.500	3.291	2.484	2.394	....	....	....
3.500	9.2	2.992	4.250	4.000	2.590	2.481	....	....	....
3.500	10.2	2.922	4.250	4.000	2.915	2.806	....	....	....
3.500	12.7	2.750	4.250	4.000	3.682	3.572	....	....	....
4.000	11.0	3.476	4.750	4.406	3.077	2.951	....	....	....
4.500	12.6	3.958	5.200	4.938	3.600	3.459	....	....	....

Hunting Interlock, Inc. — Seal-Lock FGL

Type: Coupled, Non-upset		Seal: Metal-to-Metal, Resilient					J-55	L/N-80	P-110
D	w	du	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb		
2.375	4.6	1.740	2.875	2.720	....	1.304	1000.0	1000.0	1000.0
2.875	6.4	2.140	3.500	3.260	....	1.812	1200.0	1200.0	1200.0
3.500	9.2	2.670	4.250	4.000	....	2.590	1800.0	1800.0	1800.0

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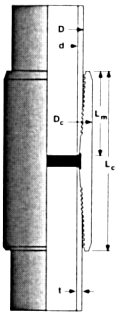
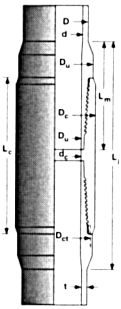
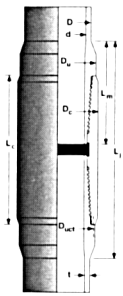
1996 Tubular Design Tables: Part I



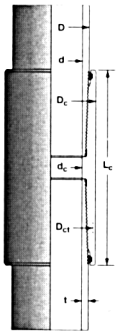
HUNTING INTERLOCK SEAL-LOCK PC is a non-upset, threaded and coupled connection for plastic coated applications that permits fast stabbing and make-and-break while minimizing danger of cross-threading. Thread and seal resist make-up damage. Connection strength is essentially equal to pipe body, and an internal elastomeric ring resists connection corrosion damage in harsh environments. Design features a gas tight metal-to-metal seal.



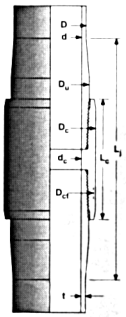
HUNTING INTERLOCK TC NU-LOCK is designed for maximum performance in service where leak resistance, high joint strength, multiple make/break use and high resistance to torsional damage are required. External and internal shoulders resist damage caused by high torque. It has the special negative flank thread and conical metal-to-metal seal of SEAL-LOCK and is available with special clearance coupling.



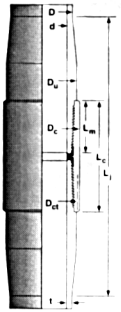
HUNTING INTERLOCK TC NU-LOCK PC is designed for plastic coated applications where maximum leak resistance, joint strength, multiple make/break use and resistance to torsional damage is required. External and internal shoulder is a positive torque stop and provides visual assurance of proper make-up. Connection has the special negative flank thread and conical metal-to-metal seal of SEAL-LOCK and is available with special clearance coupling. An elastomeric ring is suitable for use with highly corrosive fluids or gases.



HUNTING INTERLOCK THREADMASTERS TKC 8RD connections have an integral torque shoulder to provide proper make-up when used with API 8RD threads. Separate internal and external seals block pressure from thread area, allowing threads to serve principally as tensile joining members. Seals use specially compounded resilient elastomers to create a high temperature gas-tight seal and enable couplings to be used in workstrings that must withstand repeated make/break.



HUNTING INTERLOCK THREADMASTERS TKC 8RD PLUS is a simplified version of standard TKC 8RD, featuring straight counterbore, bevelled OD and shorter length. It continues to provide proper make-up when used with API 8RD threads. Internal shoulder provides positive torque stop and metal-to-metal seal when using pins meeting TKC pin and finish specification. It can withstand bending and torsional loads downhole within design parameters. Separate internal seals block pressure from threaded area allowing threads to serve principally as tensile members.



HUNTING INTERLOCK THREADMASTERS TKC TS-8 is an enhanced version of MMS connection. Standard API 8RD threads are cut on an oversized upset. This provides an external shoulder that serves as a positive torque stop and is capable of downhole rotation within design connection parameters. It is a holiday-free, internal flush connection, designed for coated tubing.

Hunting Interlock, Inc. — Seal-Lock PC

Type: Coupled, non-upset Seal: Metal-to-metal, resilient							J-55	L/N-80	P-110
D	w	d	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb		
2.375	4.6	1.995	2.875	....	....	1.304	1000.0	1000.0	1000.0
2.375	5.2	1.939	2.875	....	....	1.304	1000.0	1000.0	1000.0
2.375	5.8	1.867	2.875	....	....	1.304	1000.0	1000.0	1000.0
2.875	6.4	2.441	3.500	....	....	1.812	1200.0	1200.0	1200.0
2.875	7.7	2.323	3.500	....	....	2.254	1200.0	1200.0	1200.0
2.875	8.6	2.259	3.500	....	....	2.484	1200.0	1200.0	1200.0
3.500	9.2	2.992	4.250	....	....	2.590	1800.0	1800.0	1800.0
3.500	10.2	2.922	4.250	....	....	2.915	1800.0	1800.0	1800.0
3.500	12.7	2.750	4.250	....	....	3.682	1800.0	1800.0	1800.0

Hunting Interlock, Inc. — TC NU-LOCK

Type: Coupled, upset Seal: Metal-to-metal							J-55	L/N-80	P-110
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb		
2.375	4.7	1.995*	2.875	2.700	....	....	1200.0	1200.0	1200.0
2.375	6.0	1.867	2.875	2.700	....	....	1200.0	1200.0	1200.0
2.375	6.2	1.853	2.875	2.700	....	....	1200.0	1200.0	1200.0
2.370	7.7	1.703	2.875	2.700	....	....	1200.0	1200.0	1200.0
2.875	6.5	2.441*	3.500	3.220	....	....	1800.0	1800.0	1800.0
2.875	7.9	2.323	3.500	3.220	....	....	1800.0	1800.0	1800.0
2.875	8.7	2.259	3.500	3.220	....	....	1800.0	1800.0	1800.0
2.875	9.5	2.195	3.500	3.220	....	....	1800.0	1800.0	1800.0
2.875	11.0	2.065	3.500	3.220	....	0.000	1800.0	1800.0	1800.0
3.500	9.3	2.992*	4.250	3.865	....	....	2500.0	2500.0	2500.0
3.500	10.3	2.992*	4.250	3.865	....	....	2500.0	2500.0	2500.0
3.500	13.0	2.750	4.250	3.865	....	....	2500.0	2500.0	2500.0
3.500	15.5	2.602	4.250	3.865	....	....	2500.0	2500.0	2500.0
3.500	16.7	2.480	4.250	3.865	....	0.000	2500.0	2500.0	2500.0

*Ou value is less than the d value.

Hunting Interlock, Inc. — TC NU-LOCK PC

Type: Coupled, upset Seal: Metal-to-metal							J-55	L/N-80	P-110
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb		
2.375	4.7	1.995	2.875	2.700	....	....	1200.0	1200.0	1200.0
2.375	6.0	1.867	2.875	2.700	....	....	1200.0	1200.0	1200.0
2.375	6.2	1.853	2.875	2.700	....	....	1200.0	1200.0	1200.0
2.375	7.7	1.703	2.875	2.700	....	....	1200.0	1200.0	1200.0
2.875	6.5	2.441	3.500	3.220	....	....	1800.0	1800.0	1800.0
2.875	7.9	2.323	3.500	3.220	....	....	1800.0	1800.0	1800.0
2.875	8.7	2.259	3.220	2.259	....	....	1800.0	1800.0	1800.0
2.875	9.5	2.195	3.500	3.220	....	....	1800.0	1800.0	1800.0
2.875	11.0	2.065	3.500	3.220	....	....	1800.0	1800.0	1800.0
3.500	9.3	2.992	4.250	3.865	....	....	2500.0	2500.0	2500.0
3.500	10.3	2.922	4.250	3.865	....	....	2500.0	2500.0	2500.0
3.500	13.0	2.750	4.250	3.865	....	....	2500.0	2500.0	2500.0
3.500	15.5	2.602	4.255	3.865	....	....	2500.0	2500.0	2500.0
3.500	16.7	2.480	4.250	3.865	....	....	2500.0	2500.0	2500.0

Hunting Interlock, Inc. — Threadmasters TKC 4040

Type: NUE, T&C Seal: Metal-to-metal, thread, elastomeric							J-55	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	"Delta Torque," 1,000 ft-lb		
2.375	4.6	1.975	2.875	2.707	1.304	1.230	0.32-0.76	0.46-1.1	0.61-1.51
2.375	5.8	1.847	2.875	2.707	1.692	1.618	....	0.99-1.77	1.3-2.23
2.875	6.4	2.421	3.500	3.291	1.812	1.722	0.56-1.41	0.81-2.05	1.01-2.54
2.875	7.8	2.303	3.500	3.291	2.254	2.164	....	1.49-2.95	2.04-4.05
2.875	8.6	2.239	3.500	3.291	2.484	2.394	....	1.92-3.41	2.64-4.68
3.500	9.2	2.972	4.250	4.000	2.590	2.481	1.03-2.70	1.49-3.92	1.96-5.39
3.500	10.2	2.902	4.250	4.000	2.915	2.806	1.40-3.24	2.04-4.71	....
3.500	12.7	2.730	4.250	4.000	3.682	3.572	....	3.68-6.54	4.83-8.99
4.000	11.0	3.456	4.750	4.500	3.077	2.951	1.27-3.71	1.85-5.39	....
4.500	12.6	3.938	5.200	5.031	3.600	3.459	1.57-4.95	2.28-7.20	....

Hunting Interlock, Inc. — Threadmasters TKC 8RD

Type: EUE, T&C Seal: Metal-to-metal, thread, elastomeric							J-55	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	"Delta Torque," 1,000 ft-lb		
2.375	4.7	1.975	3.063	2.910	1.304	1.594	0.57-1.35	0.82-1.96	1.08-2.70
2.375	6.0	1.847	3.063	2.910	1.692	1.982	....	1.50-2.67	1.96-3.66
2.875	6.5	2.421	3.668	3.460	1.812	2.162	0.87-2.21	1.27-3.21	1.67-4.42
2.875	7.9	2.303	3.668	3.460	2.254	2.604	....	1.97-3.91	2.76-5.73
2.875	8.7	2.239	3.668	3.460	2.484	2.834	....	2.62-4.65	3.44-6.40
3.500	9.3	2.972	4.500	4.180	2.590	3.190	1.56-4.09	2.27-5.95	2.98-8.18
3.500	10.3	2.902	4.500	4.180	2.915	3.515	....	....	....
3.500	13.0	2.730	4.500	4.180	3.682	4.282	....	4.92-8.75	6.46-12.01
4.000	11.0	3.456	5.000	4.625	3.077	3.761	1.87-5.43	2.72-7.91	....
4.500	12.8	3.938	5.563	5.125	3.600	4.389	2.22-7.02	3.23-10.21	....

Hunting Interlock, Inc. — TS-8

Type: EUE, T&C Seal: Thread, elastomeric							J-55	L/N-80	P-110
D	w	d/du	Du	Duct	At	Ac	"Delta Torque," 1,000 ft-lb		
2.375	4.7	1.995	3.063	2.910	1.304	1.594	0.75-1.00	0.75-1.00	0.75-1.00
2.375	6.0	1.867	3.063	2.910	1.692	1.982	0.75-1.00	0.75-1.00	0.75-1.00
2.875	6.5	2.441	3.668	3.460	1.812	2.162	0.75-1.00	0.75-1.00	0.75-1.00
2.875	7.9	2.323	3.668	3.460	2.254	2.604	0.75-1.00	0.75-1.00	0.75-1.00
2.875	8.7	2.259	3.668	3.460	2.484	2.834	0.75-1.00	0.75-1.00	0.75-1.00
3.500	9.3	2.992	4.500	4.180	2.590	3.190	0.75-1.00	0.75-1.00	0.75-1.00
3.500	10.3	2.922	4.500	4.180	2.915	3.515	0.75-1.00	0.75-1.00	0.75-1.00
3.500	13.0	2.750	4.500	4.180	3.682	4.282	0.75-1.00	0.75-1.00	0.75-1.00
4.000	11.0	3.476	5.000	4.625	3.077	3.761	0.75-1.00	0.75-1.00	0.75-1.00
4.500	12.8	3.958	5.563	5.125	3.600	4.389	0.75-1.00	0.75-1.00	0.75-1.00

TS-8 min./max. "Delta Torques" are applied strictly to ensure proper make-up.
"Delta Torque" is torque applied to connection after shouldering.

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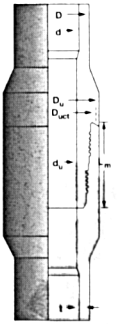
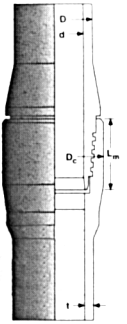
Hydril — CS/PH-6/PH-4 TUBING

Type: Upset, integral		Seal: 2, Metal-to-metal					J-55	L/N-80	C-90	C/T-95	P-110
D	w	d	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb				
1.050	1.2	0.672	1.327	1.300	0.333	0.333	2 - 3	3 - 4	3 - 4	3 - 4	3 - 4
1.050	1.5	0.648	1.327	....	0.433	0.433	2 - 3	3 - 4	3 - 4	3 - 4	3 - 4
1.315	1.8	0.955	1.552	1.525	0.494	0.494	3 - 4	4 - 5	4 - 5	4 - 5	4 - 5
1.315	2.3	0.848	1.600	....	0.639	0.639	3 - 4	4 - 5	4 - 5	4 - 5	4 - 5
1.660	2.4	1.286	1.883	1.858	0.669	0.669	4 - 5	6 - 8	6 - 8	6 - 8	6 - 8
1.660	3.0	1.184	1.927	....	0.881	0.881	4 - 5	6 - 8	6 - 8	6 - 8	6 - 8
1.660	3.2	1.170	1.927	....	0.909	0.909	4 - 5	6 - 8	6 - 8	6 - 8	6 - 8
1.900	2.9	1.516	2.113	2.094	0.799	0.799	6 - 8	8 - 10	8 - 10	8 - 10	8 - 10
1.900	3.6	1.406	2.162	....	1.068	1.068	6 - 8	8 - 10	8 - 10	8 - 10	8 - 10
1.900	4.2	1.368	2.179	....	1.157	1.157	6 - 8	8 - 10	8 - 10	8 - 10	8 - 10
2.063	3.3	1.657	2.330	2.295	0.935	0.935	7 - 9	9 - 11	9 - 11	9 - 11	9 - 11
2.063	4.5	1.519	2.460	2.407	1.299	1.299	7 - 9	9 - 11	9 - 11	9 - 11	9 - 11
2.375	4.7	1.901	2.700	2.655	1.304	1.304	1.1 - 1.4	1.5 - 1.9	1.5 - 1.9	1.5 - 1.9	1.5 - 1.9
2.375	5.3	1.845	2.750	2.700	1.477	1.477	1.1 - 1.4	1.5 - 1.9	1.5 - 1.9	1.5 - 1.9	1.5 - 1.9
2.375	6.0	1.773	2.806	2.782	1.692	1.692	....	2.2 - 2.8	2.4 - 3.0	2.5 - 3.1	2.7 - 3.4
2.375	6.2	1.759	2.938	2.794	1.733	1.733	....	2.2 - 2.8	2.4 - 3.0	2.5 - 3.1	2.7 - 3.4
2.375	6.6	1.691	3.032	2.854	1.928	1.928	....	2.2 - 2.8	2.4 - 3.0	2.5 - 3.1	2.7 - 3.4
2.375	7.7	1.609	3.125	2.924	2.152	2.152	....	2.2 - 2.8	2.4 - 3.0	2.5 - 3.1	2.7 - 3.4
2.875	6.5	2.347	3.210	3.166	1.812	1.812	1.5 - 1.9	2.1 - 2.6	2.1 - 2.6	2.1 - 2.6	2.1 - 2.6
2.875	7.9	2.229	3.438	3.312	2.254	2.254	....	3.0 - 3.8	3.2 - 4.0	3.3 - 4.1	3.5 - 4.4
2.875	8.7	2.165	3.500	3.365	2.484	2.484	....	3.0 - 3.8	3.2 - 4.0	3.3 - 4.1	3.5 - 4.4
2.875	9.5	2.101	3.625	3.419	2.708	2.708	....	4.5 - 5.6	4.9 - 6.1	5.1 - 6.4	5.5 - 6.9
2.875	10.7	1.997	3.688	3.509	3.058	3.058	....	4.5 - 5.6	4.9 - 6.1	5.1 - 6.4	5.5 - 6.9
2.875	11.0	1.971	3.750	....	3.143	3.143	....	5.0 - 6.3	5.6 - 7.0	5.9 - 7.4	6.5 - 8.1
2.875	11.7	1.901	3.750	....	3.366	3.366	....	5.0 - 6.3	5.6 - 7.0	5.9 - 7.4	6.5 - 8.1
3.500	9.2	2.867	3.915	3.859	2.590	2.590	2.5 - 3.1	3.0 - 3.8	3.0 - 3.8	3.0 - 3.8	3.0 - 3.8
3.500	10.3	2.797	3.915	....	2.915	2.915	2.5 - 3.1	3.0 - 3.8	3.0 - 3.8	3.0 - 3.8	3.0 - 3.8
3.500	13.0	2.625	4.313	4.189	3.682	3.682	....	5.5 - 6.9	6.1 - 7.6	6.4 - 8.0	7.0 - 8.8
3.500	14.3	2.515	4.410	4.287	4.147	4.147	....	5.5 - 6.9	6.1 - 7.6	6.4 - 8.0	7.0 - 8.8
3.500	15.8	2.423	4.500	4.367	4.522	4.522	....	5.5 - 6.9	6.1 - 7.6	6.4 - 8.0	7.0 - 8.8
3.500	16.7	2.355	4.500	....	4.791	4.791	....	7.5 - 9.4	8.3 - 10.4	8.7 - 10.9	9.5 - 11.9
3.500	17.1	2.315	4.563	....	4.945	4.945	....	8.0 - 10.0	8.8 - 11.0	9.2 - 11.5	10.0 - 12.5
4.000	11.0	3.351	4.417	4.359	3.077	3.077	3.0 - 3.8	3.5 - 4.4	3.5 - 4.4	3.5 - 4.4	3.5 - 4.4
4.000	13.4	3.215	4.625	4.514	3.805	3.805	....	5.5 - 6.9	6.1 - 7.6	6.4 - 8.0	7.0 - 8.8
4.000	16.1	3.045	4.765	4.655	4.674	4.674	....	5.5 - 6.9	6.1 - 7.6	6.4 - 8.0	7.0 - 8.8
4.000	19.0	2.875	5.000	....	5.498	5.498	....	8.5 - 10.6	9.3 - 11.6	9.7 - 12.1	10.5 - 13.1
4.000	21.1	2.751	5.090	....	6.070	6.070	....	9.0 - 11.3	9.8 - 12.3	10.2 - 12.8	11.0 - 13.8
4.000	22.5	2.655	5.188	....	6.496	6.496	....	9.5 - 11.9	10.3 - 12.9	10.7 - 13.4	11.5 - 14.4
4.500	12.8	3.833	4.920	4.861	3.600	3.600	3.5 - 4.4	4.5 - 5.6	4.5 - 5.6	4.5 - 5.6	4.5 - 5.6
4.500	13.5	3.795	4.955	4.890	3.836	3.836	3.5 - 4.4	4.5 - 5.6	4.5 - 5.6	4.5 - 5.6	4.5 - 5.6
4.500	15.5	3.701	5.125	5.021	4.407	4.407	....	6.0 - 7.5	6.6 - 8.3	6.9 - 8.6	7.5 - 9.4
4.500	17.0	3.615	5.210	5.091	4.918	4.918	....	6.7 - 8.4	7.4 - 9.3	7.7 - 9.6	8.4 - 10.5
4.500	19.2	3.515	5.313	5.170	5.498	5.498	....	7.5 - 9.4	8.3 - 10.4	8.7 - 10.9	9.5 - 11.9
4.500	21.6	3.375	5.500	....	6.283	6.283	....	9.5 - 11.9	10.5 - 13.1	11.0 - 13.8	12.0 - 15.0
4.500	24.0	3.255	5.563	....	6.932	6.932	....	10.0 - 12.5	11.2 - 14.0	11.8 - 14.8	13.0 - 16.3
4.500	26.5	3.115	5.688	....	7.660	7.660	....	11.5 - 14.4	12.7 - 15.9	13.3 - 16.6	14.5 - 18.1
5.000	18.0	4.151	5.515	....	5.275	5.275	5.0 - 6.3	6.9 - 8.6	7.7 - 9.6	8.1 - 10.1	9.2 - 11.5
5.000	20.3	4.059	5.585	....	5.886	5.886	5.2 - 6.5	7.1 - 8.9	7.9 - 9.9	8.3 - 10.4	9.4 - 11.8
5.000	21.4	4.001	5.630	....	6.264	6.264	5.9 - 7.4	8.0 - 10.0	8.9 - 11.1	9.4 - 11.8	10.6 - 13.3
5.000	23.2	3.919	5.700	....	6.791	6.791	....	9.5 - 11.9	10.5 - 13.1	11.0 - 13.8	12.5 - 15.6
5.000	24.1	3.875	5.735	....	7.069	7.069	....	9.6 - 12.0	10.6 - 13.3	11.1 - 13.9	12.6 - 15.8
5.000	27.0	3.755	5.835	....	7.811	7.811	....	9.9 - 12.4	10.9 - 13.6	11.4 - 14.3	12.9 - 16.1
5.500	17.0	4.767	5.920	....	4.962	4.962	4.2 - 5.3	5.8 - 7.3	6.4 - 8.0	6.8 - 8.5	7.7 - 9.6
5.500	20.0	4.653	6.005	....	5.828	5.828	6.2 - 7.8	8.5 - 10.6	9.4 - 11.8	9.9 - 12.4	11.2 - 14.0
5.500	23.0	4.545	6.090	....	6.630	6.630	....	8.8 - 11.0	9.7 - 12.1	10.2 - 12.8	11.6 - 14.5
5.500	26.0	4.423	6.185	....	7.513	7.513	....	11.5 - 14.4	12.8 - 16.0	13.4 - 16.8	15.2 - 19.0
5.500	26.8	4.375	6.225	....	7.854	7.854	....	11.7 - 14.6	12.9 - 16.1	13.5 - 16.9	15.4 - 19.3
5.500	28.4	4.315	6.275	....	8.275	8.275	....	11.9 - 14.9	13.1 - 16.4	13.7 - 17.1	15.6 - 19.5



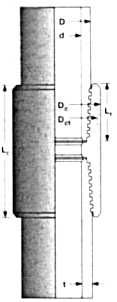
HYDRIL CS, PH-6, and PH-4 is multi-purpose for heavy-wall tubing, high-pressure, and single or dual completions. It exceeds pipe body in tension, internal yield and collapse. Two-step thread form provides rugged torque shoulders, recess-free bore, streamlined OD and fast make-up.



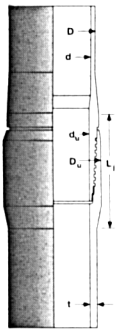
HYDRIL Series 500 Type 501 is offered on lightest API tubing weights and has been used extensively for moderate depth workstring applications. It is an integral connection machined on API external upset ends providing pipe body strength at an economical price and is interchangeable with Type 561.

Hydril — Series 500 Type 501 Tubing

Type:API Upset - Integral		Seal: Thread					J-55	L/N-80
D	w	d	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb	
2.375	4.7	1.901	2.657	....	1.304	1.304	1.4 - 3.1	1.4 - 4.5
2.875	6.5	2.347	3.192	....	1.812	1.812	1.7 - 4.6	1.7 - 6.6
3.500	9.3	2.867	3.886	....	2.590	2.590	2.5 - 6.8	2.5 - 9.9
4.000	11.0	3.351	4.406	....	3.077	3.077	3.0 - 8.9	3.0 - 12.9
4.500	11.6	3.875	4.891	....	3.338	3.338	3.2 - 11.3	3.2 - 16.4
4.500	12.8	3.833	4.926	....	3.600	3.600	3.5 - 11.3	3.5 - 16.4



HYDRIL Series 500 Type 503 is offered on lightest API tubing weights for production tubing and workstring applications. It is an integral connection machined on long API external upset ends providing pipe body strength along with a metal seal.



HYDRIL Series 500 Type 533 is recommended for demanding production tubing and workstring applications. An integral connection machined on internal-external upset ends, it provides pipe body strength combined with sealing reliability of a metal seal, is interchangeable with Type 563 and available with optional CB feature.

Hydril — Series 500 Type 503 Tubing

Type:API Upset - Integral		Seal: Thread					J-55	L/N-80
D	w	d	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb	
2.375	4.7	1.901	2.657	....	1.304	1.304	1.5 - 3.1	1.5 - 4.5
2.875	6.5	2.347	3.192	....	1.812	1.812	1.9 - 4.6	1.9 - 6.6
3.500	9.3	2.867	3.886	....	2.590	2.590	2.8 - 6.8	2.8 - 9.9
4.000	11.0	3.351	4.406	....	3.077	3.077	3.3 - 8.9	3.3 - 12.9
4.500	12.8	3.833	4.926	....	3.600	3.600	3.8 - 11.3	3.8 - 16.4

Hydril — Series 500 Type 561 Tubing

Type:API Upset - Integral		Seal: Thread					J-55	L/N-80
D	w	d	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb	
2.375	4.7	1.901	2.875	2.657	1.304	1.150	1.1 - 2.0	1.1 - 2.9
2.875	6.5	2.347	3.500	3.192	1.812	1.625	1.4 - 3.0	1.4 - 4.4
3.500	9.3	2.867	4.250	3.886	2.590	2.362	2.1 - 4.4	2.1 - 6.5
4.000	9.5	3.423	4.750	4.406	2.680	2.419	2.1 - 5.8	2.1 - 8.5
4.000	11.0	3.351	4.750	4.406	3.077	2.816	2.4 - 5.8	2.4 - 8.5
4.500	11.6	3.875	5.200	4.891	3.338	3.044	2.6 - 7.4	2.6 - 10.8
4.500	12.8	3.833	5.200	4.926	3.600	3.307	2.8 - 7.4	2.8 - 10.8

HYDRIL Series 500 Type 561 is offered on lightest API tubing weights and recommended for moderate depth production tubing applications. Type 561 equipped with CB feature has been used for plastic-coated injection and productoin strings.

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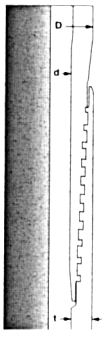
1996 Tubular Design Tables: Part I



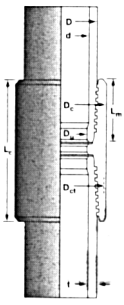
HYDRIL Series 500 Type 511 in tubing sizes is recommended for repair string, scab liner, and horizontal applicatoins. With this integral connection's overall structural capability combined with its pipe body OD, Type 511 has been selected for horizontal linders in re-entry wells, relatively long repair strings, and slim-hole liners.

Hydril — Series 500 Type 533 Tubing

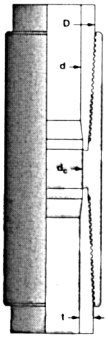
Type: Upset, integral		Seal: Metal-to-metal, thread					J-55	L/N-80	C-90	C/T-95	P-110	Q-125
D	w	d	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb					
2.375	4.7	1.901	2.657	....	1.304	1.304	1.5 - 3.1	1.5 - 4.5	1.5 - 5.0	1.5 - 5.3	1.5 - 6.2	1.5 - 7.1
2.375	5.3	1.845	2.685	....	1.477	1.477	....	1.8 - 4.5	1.8 - 5.0	1.8 - 5.3	1.8 - 6.2	1.8 - 7.1
2.375	6.0	1.773	2.737	....	1.692	1.692	....	2.1 - 4.5	2.1 - 5.0	2.1 - 5.3	2.1 - 6.2	2.1 - 7.1
2.375	6.6	1.691	2.793	....	1.928	1.928	....	2.2 - 4.5	2.2 - 5.0	2.2 - 5.3	2.2 - 6.2	2.2 - 7.1
2.375	7.5	1.609	2.845	....	2.152	2.152	....	2.6 - 4.5	2.6 - 5.0	2.6 - 5.3	2.6 - 6.2	2.6 - 7.1
2.875	6.5	2.347	3.192	....	1.812	1.812	1.9 - 4.6	1.9 - 6.6	1.9 - 7.4	1.9 - 7.9	1.9 - 9.1	1.9 - 11.0
2.875	7.9	2.229	3.282	....	2.254	2.254	....	2.4 - 6.6	2.4 - 7.4	2.4 - 7.9	2.4 - 9.1	2.4 - 11.0
2.875	8.7	2.165	3.328	....	2.484	2.484	....	2.5 - 6.6	2.5 - 7.4	2.5 - 7.9	2.5 - 9.1	2.5 - 11.0
2.875	9.5	2.101	3.337	....	2.708	2.708	....	3.9 - 8.5	3.9 - 9.6	3.9 - 10.1	3.9 - 11.7	3.9 - 13.3
2.875	10.7	1.997	3.405	....	3.058	3.058	....	4.6 - 8.5	4.6 - 9.6	4.6 - 10.1	4.6 - 11.7	4.6 - 13.3
2.875	11.7	1.901	3.464	....	3.366	3.366	....	5.1 - 8.5	5.1 - 9.6	5.1 - 10.1	5.1 - 11.7	5.1 - 13.3
3.500	9.3	2.867	3.886	....	2.590	2.590	2.8 - 6.8	2.8 - 9.9	2.8 - 11.1	2.8 - 11.7	2.8 - 13.6	2.8 - 15.4
3.500	10.3	2.797	3.941	....	2.915	2.915	....	3.2 - 9.9	3.2 - 11.1	3.2 - 11.7	3.2 - 13.6	3.2 - 15.4
3.500	13.0	2.625	4.067	....	3.682	3.682	....	4.0 - 9.9	4.0 - 11.1	4.0 - 11.7	4.0 - 13.6	4.0 - 15.4
3.500	14.3	2.515	4.100	....	4.147	4.147	....	7.0 - 14.7	7.0 - 16.6	7.0 - 17.5	7.0 - 20.0	7.0 - 22.5
3.500	15.8	2.423	4.160	....	4.522	4.522	....	7.8 - 14.7	7.8 - 16.6	7.8 - 17.5	7.8 - 20.0	7.8 - 22.5
3.500	16.7	2.355	4.202	....	4.791	4.791	....	8.3 - 14.7	8.3 - 16.6	8.3 - 17.5	8.3 - 20.0	8.3 - 22.5
3.500	17.1	2.315	4.226	....	4.945	4.945	....	8.7 - 14.7	8.7 - 16.6	8.7 - 17.5	8.7 - 20.0	8.7 - 22.5
4.000	11.0	3.351	4.406	....	3.077	3.077	3.3 - 8.9	3.3 - 12.9	3.3 - 14.6	3.3 - 15.4	3.3 - 17.8	3.3 - 20.2
4.000	11.6	3.303	4.444	....	3.337	3.337	3.7 - 8.9	3.7 - 12.9	3.7 - 14.6	3.7 - 15.4	3.7 - 17.8	3.7 - 20.2
4.000	13.4	3.215	4.513	....	3.805	3.805	....	4.0 - 12.9	4.0 - 14.6	4.0 - 15.4	4.0 - 17.8	4.0 - 20.2
4.000	14.8	3.115	4.549	....	4.322	4.322	....	6.2 - 16.8	6.2 - 18.9	6.2 - 19.9	6.2 - 23.0	6.2 - 26
4.000	16.1	3.045	4.599	....	4.674	4.674	....	6.8 - 16.8	6.8 - 18.9	6.8 - 19.9	6.8 - 23.0	6.8 - 26
4.000	19.0	2.875	4.598	....	5.498	5.498	....	10.4 - 23.0	10.4 - 26	10.4 - 27	10.4 - 31	10.4 - 35
4.000	21.1	2.751	4.679	....	6.070	6.070	....	11.8 - 23.0	11.8 - 26	11.8 - 27	11.8 - 31	11.8 - 35
4.000	22.5	2.655	4.739	....	6.496	6.496	....	12.8 - 23.0	12.8 - 26	12.8 - 27	12.8 - 31	12.8 - 35
4.500	12.8	3.833	4.926	....	3.600	3.600	3.8 - 11.3	3.8 - 16.4	3.8 - 18.5	3.8 - 19.5	3.8 - 23.0	3.8 - 27
4.500	13.5	3.795	4.958	....	3.836	3.836	....	4.1 - 16.4	4.1 - 18.5	4.1 - 19.5	4.1 - 23.0	4.1 - 27
4.500	15.5	3.701	4.992	....	4.407	4.407	....	5.8 - 21.0	5.8 - 24	5.8 - 25	5.8 - 29	5.8 - 33
4.500	17.0	3.615	5.058	....	4.918	4.918	....	6.6 - 21.0	6.6 - 24	6.6 - 25	6.6 - 29	6.6 - 33
4.500	19.2	3.515	5.133	....	5.498	5.498	....	7.5 - 21.0	7.5 - 24	7.5 - 25	7.5 - 29	7.5 - 33
4.500	21.6	3.375	5.114	....	6.283	6.283	....	11.6 - 29	11.6 - 33	11.6 - 34	11.6 - 40	11.6 - 46
4.500	24.0	3.255	5.196	....	6.932	6.932	....	13.1 - 29	13.1 - 33	13.1 - 34	13.1 - 40	13.1 - 46
4.500	26.5	3.115	5.288	....	7.660	7.660	....	14.8 - 29	14.8 - 33	14.8 - 34	14.8 - 40	14.8 - 46
5.000	15.0	4.283	5.430	....	4.374	4.374	....	6.3 - 21	6.3 - 24	6.3 - 25	6.3 - 29	6.3 - 33
5.000	18.0	4.151	5.535	....	5.275	5.275	....	7.7 - 21	7.7 - 24	7.7 - 25	7.7 - 29	7.7 - 33
5.500	15.5	4.825	5.899	....	4.514	4.514	6.0 - 17.4					
5.500	17.0	4.767	5.948	....	4.962	4.962	6.7 - 17.4	6.7 - 25	6.7 - 28	6.7 - 30	6.7 - 35	6.7 - 40
5.500	20.0	4.653	6.040	....	5.828	5.828	....	8.0 - 25	8.0 - 28	8.0 - 30	8.0 - 35	8.0 - 40
5.500	23.0	4.545	6.124	....	6.630	6.630	....	9.2 - 25	9.2 - 28	9.2 - 30	9.2 - 35	9.2 - 40
5.500	26.0	4.423	6.084	....	7.513	7.513	....	11.8 - 29	11.8 - 32	11.8 - 34	11.8 - 39	11.8 - 44
5.500	26.8	4.375	6.119	....	7.854	7.854	....	12.4 - 29	12.4 - 32	12.4 - 34	12.4 - 39	12.4 - 44

Hydril — Series 500 Type 511

Type: Non-upset, integral flush		Seal: Thread					J-55	K-55	L-80	N-80	P-110
D	w	d	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb				
2.063	3.3	1.657	2.125	....	0.935	0.564	45 - 1.0	45 - 1.0	45 - 1.5	45 - 1.5	45 - 2.1
2.063	4.5	1.519	2.125	....	1.299	0.788	....	6 - 1.0	6 - 1.5	6 - 1.5	6 - 1.9
2.375	4.6	1.901	2.406	....	1.304	0.781	55 - 1.3	55 - 1.3	55 - 1.9	55 - 1.9	55 - 2.7
2.375	5.1	1.845	2.406	....	1.477	0.899	6 - 1.3	6 - 1.3	6 - 1.9	6 - 1.9	6 - 2.7
2.875	6.4	2.347	2.875	....	1.812	0.996	7 - 2.0	7 - 2.0	7 - 2.8	7 - 2.8	7 - 3.9
3.500	7.7	2.943	3.500	....	2.228	1.227	1.0 - 3.8	1.0 - 3.8	1.0 - 5.6	1.0 - 5.6	
3.500	9.2	2.867	3.500	....	2.590	1.578	1.2 - 3.8	1.2 - 3.8	1.2 - 5.6	1.2 - 5.6	1.2 - 7.6
3.500	10.2	2.797	3.500	....	2.915	1.760	1.4 - 3.8	1.4 - 3.8	1.4 - 5.6	1.4 - 5.6	1.4 - 7.6
4.000	9.5	3.423	4.000	....	2.680	1.657	1.3 - 5.2	1.3 - 5.2	1.3 - 7.5	1.3 - 7.5	
4.000	11.0	3.351	4.000	....	3.077	1.902	1.5 - 5.2	1.5 - 5.2	1.5 - 7.5	1.5 - 7.5	1.5 - 10.3
4.000	11.6	3.303	4.031	....	3.337	2.035	1.7 - 5.2	1.7 - 5.2	1.7 - 7.5	1.7 - 7.5	1.7 - 10.3
4.500	10.5	3.927	4.500	....	3.009	1.902	1.5 - 6.7	1.5 - 6.7	1.5 - 9.7	....	
4.500	11.0	3.901	4.500	....	3.174	2.058	1.6 - 6.7	1.6 - 6.7	1.6 - 9.7	1.6 - 9.7	1.6 - 13.3
4.500	11.6	3.875	4.500	....	3.338	2.111	1.6 - 6.7	1.6 - 6.7	1.6 - 9.7	1.6 - 9.7	1.6 - 13.3
4.500	12.6	3.833	4.500	....	3.600	2.096	1.7 - 7.1	1.7 - 7.1	1.7 - 10.3	1.7 - 10.3	1.7 - 14.1
4.500	13.5	3.795	4.500	....	3.836	2.326	1.8 - 7.1	1.8 - 7.1	1.8 - 10.3	1.8 - 10.3	1.8 - 14.1
4.500	15.1	3.701	4.500	....	4.407	2.696	....	....	2.4 - 11.6	2.4 - 11.6	2.4 - 16.0
5.000	15.0	4.283	5.000	....	4.374	2.654	2.0 - 8.8	2.0 - 8.8	2.0 - 12.8	2.0 - 12.8	2.0 - 17.7
5.000	18.0	4.151	5.000	....	5.275	3.311	....	3.5 - 12.6	3.5 - 18.3	3.5 - 18.3	3.5 - 25
5.500	15.5	4.825	5.500	....	4.514	2.727	2.0 - 10.8	2.0 - 10.8	2.0 - 15.7	2.0 - 15.7	
5.500	17.0	4.767	5.500	....	4.962	3.021	2.2 - 10.8	2.2 - 10.8	2.2 - 15.7	2.2 - 15.7	2.2 - 21.6



HYDRIL Series 500 Type 563 is recommended for moderate to heavy-wall pipe for production tubing applications. Combining structureal characteristics of dovetail Wedge Thread with sealing reliability of a metal seal, has been selected for use on carbon steel in sour environments and on stainless steels. It is also available with optional CB feature.



HSC is a premium non-upset connection with buttress-type thread, reverse-angle shoulder and metal-to-metal seal. Standard coupling design allows for greater than 100% efficiency.

Hydril — Series 500 Type 563 Tubing

Type: Non-upset, coupled		Seal: Metal-to-metal, thread					J-55	L/N-80	C-90	C/T-95	P-110	Q-125
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb					
2.375	4.6	1.901	2.875	2.657	1.304	1.150	1.3 - 2.1	1.3 - 3.2	1.3 - 3.6	1.3 - 3.8	1.3 - 4.3	1.3 - 4.8
2.375	5.1	1.845	2.875	2.685	1.477	1.323	....	1.5 - 3.2	1.5 - 3.6	1.5 - 3.8	1.5 - 4.3	1.5 - 4.8
2.375	5.8	1.773	2.875	2.737	1.692	1.538	....	1.7 - 3.2	1.7 - 3.6	1.7 - 3.8	1.7 - 4.3	1.7 - 4.8
2.375	6.6	1.691	2.875	2.793	1.928	1.773	....	1.8 - 3.2	1.8 - 3.6	1.8 - 3.8	1.8 - 4.3	1.8 - 4.8
2.375	7.4	1.609	2.875	....	2.152	1.998	....	1.9 - 3.2	1.9 - 3.6	1.9 - 3.8	1.9 - 4.3	1.9 - 4.8
2.875	6.4	2.347	3.500	3.192	1.812	1.625	1.6 - 3.1	1.6 - 4.7	1.6 - 5.3	1.6 - 5.6	1.6 - 6.4	1.6 - 7.2
2.875	7.8	2.229	3.500	3.282	2.254	2.067	....	2.0 - 4.7	2.0 - 5.3	2.0 - 5.6	2.0 - 6.4	2.0 - 7.2
2.875	8.6	2.165	3.500	3.328	2.484	2.297	....	2.2 - 4.7	2.2 - 5.3	2.2 - 5.6	2.2 - 6.4	2.2 - 7.2
2.875	9.4	2.101	3.500	3.337	2.708	2.521	....	3.0 - 6.4	3.0 - 7.0	3.0 - 7.4	3.0 - 8.7	3.0 - 10.0
2.875	10.5	1.997	3.500	3.405	3.058	2.871	....	3.5 - 6.4	3.5 - 7.0	3.5 - 7.4	3.5 - 8.7	3.5 - 10.0
2.875	11.5	1.901	3.500	3.464	3.366	3.179	....	4.0 - 6.4	4.0 - 7.0	4.0 - 7.4	4.0 - 8.7	4.0 - 10.0
3.500	9.2	2.867	4.250	3.886	2.590	2.362	2.4 - 4.6	2.4 - 7.0	2.4 - 7.8	2.4 - 8.2	2.4 - 9.5	2.4 - 10.8
3.500	10.2	2.797	4.250	3.941	2.915	2.687	....	2.7 - 7.0	2.7 - 7.8	2.7 - 8.2	2.7 - 9.5	2.7 - 10.8
3.500	12.7	2.625	4.250	4.067	3.682	3.454	....	2.9 - 7.0	2.9 - 7.8	2.9 - 8.2	2.9 - 9.5	2.9 - 10.8
3.500	14.3	2.515	4.250	4.100	4.147	3.878	....	5.4 - 11.0	5.4 - 12.4	5.4 - 13.0	5.4 - 15.0	5.4 - 17.0
3.500	15.5	2.423	4.250	4.160	4.522	4.253	....	6.1 - 11.0	6.1 - 12.4	6.1 - 13.0	6.1 - 15.0	6.1 - 17.0
3.500	16.7	2.355	4.250	4.202	4.791	4.521	....	6.5 - 11.0	6.5 - 12.4	6.5 - 13.0	6.5 - 15.0	6.5 - 17.0
3.500	17.0	2.315	4.250	....	4.945	4.676	....	6.7 - 11.0	6.7 - 12.4	6.7 - 13.0	6.7 - 15.0	6.7 - 17.0

Continued

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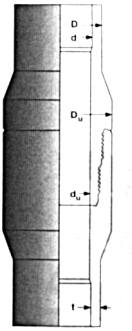
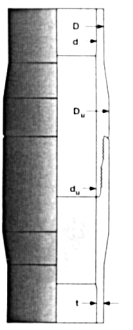
Series 500 Type 563 Tubing (continued)

Type: Non-upset, coupled			Seal: Metal-to-metal, thread				J-55	L/N-80	C-90	C/T-95	P-110	Q-125
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb					
4.000	11.0	3.351	4.750	4.406	3.077	2.816	2.8 - 6.1	2.8 - 9.1	2.8 - 10.2	2.8 - 10.8	2.8 - 12.7	2.8 - 14.6
4.000	11.6	3.303	4.750	4.444	3.337	3.076	3.0 - 6.1	3.0 - 9.1	3.0 - 10.2	3.0 - 10.8	3.0 - 12.7	3.0 - 14.6
4.000	13.2	3.215	4.750	4.513	3.805	3.544	....	3.2 - 9.1	3.2 - 10.2	3.2 - 10.8	3.2 - 12.7	3.2 - 14.6
4.000	14.8	3.115	4.750	4.549	4.322	4.061	....	4.8 - 12.4	4.8 - 13.9	4.8 - 14.7	4.8 - 17.0	4.8 - 19.3
4.000	16.1	3.045	4.750	4.599	4.674	4.413	....	5.0 - 12.4	5.0 - 13.9	5.0 - 14.7	5.0 - 17.0	5.0 - 19.3
4.000	18.9	2.875	4.750	4.598	5.498	5.064	....	8.2 - 18.0	8.2 - 20	8.2 - 21	8.2 - 24	8.2 - 27
4.000	21.1	2.751	4.750	4.679	6.070	5.636	....	9.5 - 18.0	9.5 - 20	9.5 - 21	9.5 - 24	9.5 - 27
4.000	22.2	2.655	4.750	....	6.496	6.062	....	10.4 - 18.0	10.4 - 20	10.4 - 21	10.4 - 24	10.4 - 27
4.500	11.6	3.875	5.200	4.891	3.338	3.044	3.0 - 7.7	3.0 - 11.6	3.0 - 13.2	3.0 - 14.0	3.0 - 16.0	3.0 - 18.0
4.500	12.6	3.833	5.200	4.926	3.600	3.307	3.2 - 7.7	3.2 - 11.6	3.2 - 13.2	3.2 - 14.0	3.2 - 16.0	3.2 - 18.0
4.500	13.5	3.795	5.200	4.958	3.836	3.542	....	3.5 - 11.6	3.5 - 13.2	3.5 - 14.0	3.5 - 16.0	3.5 - 18.0
4.500	15.2	3.701	5.200	4.992	4.407	4.114	....	4.4 - 15	4.4 - 17	4.4 - 18	4.4 - 21	4.4 - 24
4.500	17.0	3.615	5.200	5.058	4.918	4.625	....	5.0 - 15	5.0 - 17	5.0 - 18	5.0 - 21	5.0 - 24
4.500	18.9	3.515	5.200	5.133	5.498	5.205	....	5.9 - 15	5.9 - 17	5.9 - 18	5.9 - 21	5.9 - 24
4.500	21.5	3.375	5.200	5.114	6.283	5.794	....	9.3 - 23	9.3 - 26	9.3 - 27	9.3 - 31	9.3 - 35
4.500	23.7	3.255	5.200	....	6.932	6.443	....	10.5 - 23	10.5 - 26	10.5 - 27	10.5 - 31	10.5 - 35
4.500	26.1	3.115	5.300	....	7.660	7.171	....	12.0 - 23	12.0 - 26	12.0 - 27	12.0 - 31	12.0 - 35
5.000	15.0	4.283	5.563	5.404	4.374	3.982	5.5 - 12.7	5.5 - 18.4	5.5 - 21	5.5 - 22	5.5 - 25	5.5 - 28
5.000	18.0	4.151	5.563	....	5.275	4.853	....	6.5 - 18.4	6.5 - 21	6.5 - 22	6.5 - 25	6.5 - 28
5.500	15.5	4.825	6.050	5.873	4.514	4.050	5.2 - 15.4	....	....	....	....	....
5.500	17.0	4.767	6.050	5.921	4.962	4.498	5.8 - 15.4	5.8 - 22	5.8 - 25	5.8 - 27	5.8 - 31	5.8 - 35
5.500	20.0	4.653	6.050	....	5.828	5.364	....	6.6 - 22	6.6 - 25	6.6 - 27	6.6 - 31	6.6 - 35
5.500	23.0	4.545	6.050	....	6.630	6.165	....	7.7 - 22	7.7 - 25	7.7 - 27	7.7 - 31	7.7 - 35
5.500	26.0	4.423	6.125	6.057	7.513	6.742	....	11.0 - 27	11.0 - 30	11.0 - 32	11.0 - 37	11.0 - 42
5.500	26.8	4.375	6.125	....	7.854	7.083	....	12.0 - 27	12.0 - 30	12.0 - 32	12.0 - 37	12.0 - 42
5.500	28.4	4.315	6.125	....	8.275	7.504	....	12.5 - 27	12.5 - 30	12.5 - 32	12.5 - 37	12.5 - 42
5.500	29.7	4.251	6.250	6.085	8.718	7.871	....	16.1 - 35	16.1 - 39	16.1 - 41	16.1 - 48	16.1 - 55
5.500	32.6	4.125	6.250	6.174	9.572	8.724	....	17.6 - 35	17.6 - 39	17.6 - 41	17.6 - 48	17.6 - 55



IBERIA ITS6 is a two-step, six-pitch premium connection designed for tubing in high pressure applications. It exceeds 100% of pipe body efficiency in tension, internal yield and collapse strength. Design ensures easy stabbing and fast make-up. Also available in special clearance sizes and with ring for coated tubing.



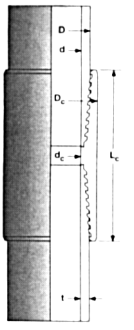
IBERIA ITS8 is a two-step, eight-pitch premium connection designed for high pressure application in single and dual string completions. It exceeds tube body efficiency with respect to tension, internal yield and collapse strength. Design ensures easy stabbing and fast make-up. Also available in special clearance sizes and with ring for coated tubing.

HSC Corporation

HSC Tubing

Type: Coupled			Seal: Metal-to-metal				J/K-55	L-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb							
2.375	4.6	1.995*	2.707	2.628	1.304	1.304	1.2	1.6	1.8	1.8	2.0	2.3	2.5	2.7
2.375	5.8	1.867	2.785	2.707	1.692	1.692	1.2	1.7	2.0	2.0	2.2	2.4	2.6	2.8
2.875	6.4	2.441*	3.240	3.159	1.812	1.812	1.7	2.4	2.8	2.8	3.2	3.5	3.9	4.2
2.875	7.7	2.323	3.337	3.274	2.254	2.254	1.9	2.5	2.9	2.9	3.3	3.7	4.1	4.3
2.875	8.6	2.259	3.364	3.327	2.484	2.484	2.1	2.8	3.3	3.3	3.8	4.2	4.6	4.9
3.500	7.7	3.068*	3.841	0.000	2.228	2.228	2.3	3.1	3.6	3.6	4.1	4.6	4.9	5.3
3.500	9.2	2.992	3.900	3.803	2.590	2.590	2.4	3.3	3.8	3.8	4.3	4.8	5.1	5.5
3.500	10.2	2.922	3.961	3.862	2.915	2.915	2.7	3.7	4.3	4.3	4.9	5.4	5.9	6.4
3.500	12.7	2.750	4.079	3.961	3.682	3.682	3.2	4.3	4.9	4.9	5.6	6.3	6.8	7.2
4.000	9.5	3.548*	4.348	0.000	2.680	2.680	2.9	4.0	4.6	4.6	5.2	5.8	6.3	6.8
4.000	10.9	3.476	4.410	4.327	3.077	3.077	3.0	4.1	4.8	4.8	5.4	6.0	6.5	7.0
4.000	13.2	3.340	4.520	4.366	3.805	3.805	3.5	4.8	5.5	5.5	6.2	7.0	7.6	8.3
4.500	10.5	4.052*	4.862	4.813	3.009	3.009	3.4	4.5	5.2	5.2	5.9	6.6	7.1	7.6
4.500	11.6	4.000*	4.862	4.813	3.338	3.338	3.5	4.6	5.4	5.4	6.0	6.7	7.2	8.0
4.500	12.6	3.958	4.892	4.813	3.601	3.601	3.5	4.8	5.5	5.5	6.2	6.9	7.2	8.0
4.500	13.5	3.920	4.961	4.813	3.836	3.836	3.7	4.9	5.6	5.6	6.4	7.0	8.0	8.3
4.500	15.1	3.826	5.010	4.892	4.407	4.407	4.2	5.8	6.7	6.7	7.6	8.3	9.1	9.8

* du value is less than the d value.



IBERIA IMT is a non-upset threaded and coupled premium connection with +100% joint efficiency and flush ID for minimum fluid turbulence, snubbing ease and more efficient plunger gas lift operation. It requires no swaging or cold forming, the design includes a hooked load flank, reverse angle torque stop with metal-to-metal seal and allows repeated make/break for workstring applications. Coupling has turned OD with clearance of IJ integral joint tubing.

Iberia Threading, Inc.

ITS6

Type: Upset, integral		Seal: Metal-to-metal					J-55	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb		
2.375	6.0	1.805	2.906	2.782	1.692	....	....	2.2	2.7
2.375	6.2	1.795	2.938	2.794	1.733	....	....	2.2	2.7
2.375	7.7	1.645	3.125	2.924	2.152	....	....	2.2	2.7
2.875	7.9	2.265	3.438	3.312	2.254	....	....	3.0	3.5
2.875	8.7	2.200	3.500	3.365	2.484	....	....	3.0	3.5
2.875	9.5	2.130	3.625	3.419	2.708	....	....	4.5	5.5
2.875	10.7	2.030	3.688	3.509	3.058	....	....	4.5	5.5
3.500	13.0	2.687	4.313	4.189	3.682	....	....	5.5	7.0
3.500	15.8	2.485	4.500	4.367	4.522	....	....	5.5	7.0
4.000	13.4	3.275	4.625	4.514	3.805	....	....	5.5	7.0
4.500	15.5	3.765	5.125	5.021	4.407	....	....	6.0	7.5
4.500	19.2	3.560	5.313	5.170	5.498	....	....	7.5	9.5

Iberia Threading, Inc.

ITS8

Type: Upset, integral		Seal: Metal-to-metal					J-55	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb		
1.050	1.2	0.687	1.327	1.300	0.330	....	0.2	0.3	0.3
1.050	1.5	0.687	1.327	....	0.433	....	0.2	0.3	0.3
1.315	1.8	0.970	1.522	1.525	0.494	....	0.3	0.4	0.4
1.315	2.3	0.864	1.600	....	0.639	....	0.3	0.4	0.4
1.660	2.4	1.300	1.883	1.858	0.669	....	0.4	0.6	0.6
1.660	3.0	1.218	1.927	....	0.881	....	0.4	0.6	0.6
1.660	3.2	1.200	1.927	....	0.909	....	0.4	0.6	0.6
1.900	2.9	1.530	2.113	2.094	0.799	....	0.6	0.8	0.8
1.900	3.6	1.440	2.162	....	1.068	....	0.6	0.8	0.8
1.900	4.4	1.390	2.179	....	1.570	....	0.6	0.8	0.8
2.063	3.3	1.700	2.330	2.295	0.935	....	0.7	0.9	0.9
2.063	4.5	1.550	2.460	2.407	1.299	....	0.7	0.9	0.9
2.375	4.7	1.945	2.700	2.655	1.304	....	1.1	1.5	1.5
2.375	5.3	1.890	2.750	2.700	1.477	....	1.1	1.5	1.5
2.875	6.5	2.371	3.210	3.166	1.812	....	1.5	2.1	2.1
3.500	9.3	2.920	3.915	3.859	2.590	....	2.5	3.0	3.0
3.500	10.3	2.870	3.915	....	2.915	....	2.5	3.0	3.0
4.000	11.0	3.395	4.417	4.359	3.077	....	3.0	3.5	3.5
4.500	12.8	3.865	4.920	4.861	3.600	....	3.5	4.5	4.5
4.500	13.5	3.840	4.955	4.890	3.836	....	3.5	4.5	4.5

Iberia Threading, Inc.

IMT

Type: Non-upset, coupled		Seal: Metal-to-metal					J-55	L/N-80	P-110
D	w	du	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb		
1.315	1.7	1.002	1.550	....	0.494	....	....	....	....
1.315	2.2	0.903	1.623	....	0.639	....	....	....	....
1.660	2.3	1.333	1.880	....	0.669	....	....	....	....
1.660	3.0	1.231	1.953	....	0.881	....	....	....	....
1.900	2.8	1.563	2.110	....	0.799	....	....	....	....
1.900	3.7	1.453	2.192	....	1.068	....	....	....	....
2.063	3.2	1.704	2.325	....	0.935	....	....	....	....
2.063	4.4	1.566	2.415	....	1.299	....	....	....	....

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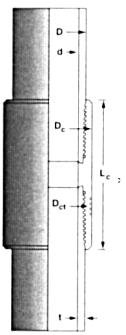
Kawasaki Steel/Hunting Oilfield Services

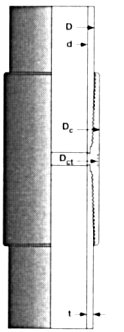
Fox Premium Connection

Type: Coupled (100% Tensile Efficient)					Seal: Metal-to-metal		J/K-55	C-75	L/N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb								
2.375	4.6	1.995*	2.723	....	1.304	1.304	0.9	1.1	1.1	1.2	1.3	1.4	1.5	1.6	1.7
2.375	5.1	1.939	2.723	....	1.477	1.477	1.1	1.3	1.3	1.4	1.5	1.6	1.8	1.9	2.0
2.375	5.8	1.867	2.782	....	1.692	1.692	1.3	1.5	1.5	1.7	1.7	1.9	2.1	2.2	2.4
2.375	6.2	1.853	2.782	....	1.733	1.733	1.3	1.5	1.6	1.7	1.8	2.0	2.2	2.3	2.5
2.375	6.3	1.815	2.876	....	1.843	1.843	1.4	1.7	1.7	1.9	1.9	2.1	2.3	2.5	2.6
2.375	7.3	1.703	2.876	....	2.152	2.152	1.7	2.1	2.2	2.4	2.4	2.7	3.0	3.3	3.4
2.875	6.4	2.441*	3.297	....	1.812	1.812	1.5	1.8	1.8	2.0	2.0	2.2	2.4	2.6	2.7
2.875	7.7	2.323	3.297	....	2.254	2.254	2.0	2.3	2.4	2.6	2.7	2.9	3.2	3.4	3.6
2.875	8.6	2.259	3.412	....	2.484	2.484	2.3	2.7	2.8	2.9	3.0	3.3	3.6	3.9	4.1
2.875	9.8	2.151	3.412	....	2.858	2.858	2.7	3.3	3.4	3.6	3.8	4.2	4.6	5.0	5.2
2.875	10.7	2.065	3.465	....	3.143	3.143	3.1	3.7	3.9	4.2	4.3	4.8	5.2	5.7	6.0
3.500	7.7	3.068*	3.878	....	2.228	2.228	1.9	2.3	2.4	2.5	2.6	2.9	3.2	3.4	3.6
3.500	9.2	2.992	3.878	....	2.590	2.590	2.3	2.8	2.9	3.1	3.2	3.5	3.9	4.2	4.4
3.500	10.2	2.922	4.053	....	2.915	2.915	2.6	3.1	3.2	3.5	3.6	3.9	4.3	4.6	4.9
3.500	12.7	2.750	4.053	....	3.682	3.682	3.7	4.5	4.7	5.1	5.3	5.8	6.4	7.0	7.4
3.500	13.7	2.674	4.150	....	4.005	4.005	4.2	5.0	5.2	5.7	5.9	6.5	7.2	7.8	8.2
3.500	15.5	2.602	4.150	....	4.304	4.304	4.6	5.7	5.8	6.3	6.6	7.3	8.1	8.8	9.3
3.500	15.8	2.548	4.297	....	4.522	4.522	4.9	5.9	6.2	6.7	6.9	7.7	8.5	9.2	9.7
4.000	9.5	3.548*	4.378	....	2.680	2.680	2.4	2.8	2.9	3.2	3.3	3.6	4.0	4.3	4.5
4.000	10.9	3.476	4.378	....	3.077	3.077	2.8	3.4	3.5	3.8	4.0	4.4	4.8	5.2	5.5
4.000	13.0	3.340*	4.556	....	3.805	3.805	3.7	4.4	4.6	5.0	5.2	5.7	6.3	6.8	7.2
4.000	14.8	3.240	4.556	....	4.322	4.322	4.5	5.4	5.7	6.1	6.4	7.1	7.8	8.6	9.0
4.000	16.5	3.140	4.625	....	4.823	4.823	5.2	6.4	6.6	7.2	7.5	8.4	9.2	10.1	10.7
4.500	10.5	4.052*	4.824	4.882	3.009	3.009	2.7	3.3	3.4	3.7	3.8	4.2	4.6	5.0	5.3
4.500	11.6	4.000*	4.867	4.882	3.338	3.338	3.1	3.7	3.9	4.2	4.3	4.8	5.3	5.7	6.0
4.500	12.6	3.958	4.901	4.882	3.600	3.600	3.4	4.1	4.2	4.6	4.8	5.3	5.8	6.3	6.6
4.500	13.5	3.920	4.932	4.882	3.836	3.836	3.7	4.4	4.6	5.0	5.1	5.7	6.3	6.8	7.2
4.500	15.1	3.826	5.005	4.882	4.407	4.407	4.4	5.4	5.6	6.0	6.3	7.0	7.6	8.3	8.8

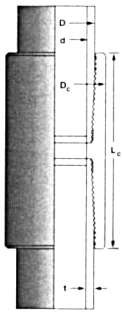
* du value is less than the d value.



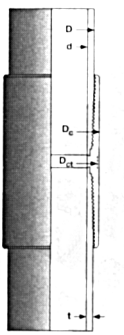
KAWASAKI STEEL/HUNTING OILFIELD SERVICES/HUNTING FOX is a premium coupled connection plain end tubing and casing, providing full pipe-rated strength in tension, burst, collapse and bending. Advanced contoured seal and shoulder design provide superior sealing performance and high resistance to over-torque. Design resists back-off from thermal shock and impact by storing a high level of energy in mating parts during make-up. A unique change in thread pitch reduces high stress concentrations and provides a more even load distribution among threads.



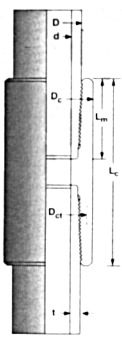
MANNESMANN BDS-TG is a threaded and coupled gas-tight connection for 4½ to 7-in. casing and tubing. Buttress type thread, metal-to-metal seal and internal shoulder make it internally flush with gas tightness assured even under combined loads and excellent for sour gas applications. Repeated make-ups do not affect sealing ability, and special clearance coupling is available.



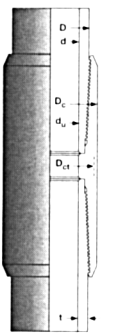
MANNESMANN MAT is a threaded and coupled hydraulically tight connection on non-upset tubing. Modified Buttress thread with 0° load flank ensures strength equal to pipe body yield. Coupling OD is smaller than API EUE. Internal shoulder gives a reliable high torque transmission without uncontrolled hoop stresses. Flush internal transition provides turbulence-free flow. It can also be used as drill tubing during workovers.



MANNESMANN TDS COUPLED is a threaded and coupled gas-tight connection on non-upset tubing. Buttress type thread, metal-to-metal seal and internal bevel shoulder make it internally flush with superior stabbing and make-up characteristics. It suitable for sour gas since cold forming in seal area does not occur under proper make-up. Repeated make-up does not affect sealing ability. Special clearance couplings available on request. 3½ to 4½ in. connections are available with teflon ring.



NKK NEW NK 35B is a threaded and coupled type premium connection for standard wall non-upset tubing designed to maintain high leak resistance without pipe-end work because of proper thickness in main-seal area. It has a smooth bore, sliding with tangent point contact and internal shoulder metal-to-metal seals, positive torque stop, 0° load flank and 45° stabbing flank for leak proof, high joint strength, easy stabbing and running, and repeatable make-up.



NKK NK 35B is a non-upset coupled connection that has high joint strength, high resistance to leakage, minimum hoop stress, excellent stabbing characteristics, repeatable make-up, smooth internal bore and strong resistance to axial load. It has three seals including a self-activating tangent point seal. Internal torque shoulder precludes possibility of over make-up.

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BDS-TG

Type: Coupled, non-upset			Seal: Metal-to-metal				J/K-55	L/N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150	Grade 155	MRW Cr13-80	MRW Cr13-95
D	w	d	Dc	Dct	At	Ac	Make-up torque, ft-lb										
4.500	13.5	3.795	5.000	4.875	3.836	4.512	2800-3540	3250-3760	3390-4130	3690-4430	4020-5020	4650-5610	5020-5900	5240-6120	5240-6120	3690-5000	4430-5310
4.500	15.2	3.707	5.000	4.875	4.407	4.512	3390-4430	3980-4940	4570-5310	4790-5900	5530-6860	6270-7380	6560-7740	6860-8110	6860-8110	4500-5490	5380-6640
4.500	17.0	3.615	5.000	4.875	4.918	4.512	3840-4790	4350-5380	4940-6200	5090-6340	5900-7380	6790-8480	7080-8850	7380-9220	7380-9220	5240-6400	6110-7610
4.500	18.9	3.515	5.000	4.875	5.498	4.512	3910-4870	4570-5680	5160-6490	5310-6640	6120-7670	7010-8780	7380-9150	7670-9660	7670-9660	5530-6860	6420-7970
4.500	21.5	3.375	5.000	4.875	6.283	4.512	3980-5020	4940-6200	5460-6790	5610-7010	6490-8110	7380-9220	7380-9590	8110-10330	8110-10330	5900-7450	6730-8410
5.000	15.0	4.283	5.563	5.375	4.374	5.648	3020-3610	3320-4130	3760-4720	3910-4870	4280-5310	4430-5530	4570-5750	4720-5900	4720-5900	4000-4950	4510-5660
5.000	18.0	4.151	5.563	5.375	5.275	5.648	3540-4430	4280-5310	4570-5530	4720-5900	5310-6640	5900-7380	6200-7740	6490-8110	6490-8110	5160-6340	5660-7080
5.000	21.4	4.001	5.563	5.375	6.264	5.648	4060-4940	4870-5750	5160-5970	5310-6200	5830-6930	6340-7670	6790-8110	6930-8480	7150-8700	5840-6820	6290-7490
5.000	23.2	3.919	5.563	5.375	6.791	5.648	4280-5160	5090-5900	5380-6270	5530-6420	6050-7150	6710-7820	7230-8330	7450-8780	7670-9000	5900-6970	6490-7710
5.000	24.1	3.875	5.563	5.375	7.069	5.648	4350-5240	5240-5970	5530-6490	5680-6640	6270-7380	6860-7970	7450-8560	7670-9000	7890-9220	5970-7040	6640-7820
5.500	15.5	4.825	6.050	5.875	4.514	6.099	2950-3610	3320-4130	3610-4570	3760-4720	4060-5090	4200-5310	4350-5460	4430-5610	4570-5750	4000-4950	4510-5660
5.500	17.0	4.767	6.050	5.875	4.962	6.099	3500-4060	3980-5020	4430-5610	4570-5750	4940-6200	5160-6490	5310-6640	5460-6860	5610-7010	4800-6000	5480-6900
5.500	20.0	4.653	6.050	5.875	5.828	6.099	3760-4790	5160-6420	5750-7230	5900-7380	6270-7890	6640-8330	6930-8700	7230-9070	7380-9220	6200-7670	7080-8860
5.500	23.0	4.545	6.050	5.875	6.630	6.099	4200-5310	5610-7010	6340-7970	6490-8110	6860-8630	7230-9070	7380-9590	7520-9740	7670-9880	6700-8400	7790-9730

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MAT

Type: Coupled, non-upset			Seal: Threaded				J/K-55	L/N-80	C-90	C/T-95	P-110	Grade 155	Grade 165	MRW Cr13-80	MRW Cr13-95	MRW 110-SS	MRW AF22-130	MRW 2832-100
D	w	du	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb											
2.375	4.0	2.041	2.875	....	1.158	2.546	....	....	....	....	....	....	....	....	....	....	....	....
2.375	4.6	1.995	2.875	....	1.304	2.546	....	....	....	....	....	....	....	....	....	....	....	....
2.375	5.1	1.939	2.875	....	1.477	2.546	....	....	....	....	....	....	....	....	....	....	....	....
2.375	5.8	1.867	2.875	....	1.692	2.546	....	....	....	....	....	....	....	....	....	....	....	....
2.875	6.4	2.441	3.500	....	1.812	3.310	....	....	....	....	....	....	....	....	....	....	....	....
2.875	7.8	2.323	3.500	....	2.253	3.310	....	....	....	....	....	....	....	....	....	....	....	....
2.875	8.6	2.259	3.500	....	2.484	3.310	....	....	....	....	....	....	....	....	....	....	....	....
3.500	7.7	3.068	4.250	....	2.228	4.900	....	....	....	....	....	....	....	....	....	....	....	....
3.500	9.2	2.992	4.250	....	2.590	4.900	....	....	....	....	....	....	....	....	....	....	....	....
3.500	10.2	2.922	4.250	....	2.915	4.900	....	....	....	....	....	....	....	....	....	....	....	....
3.500	12.7	2.750	4.250	....	3.682	4.900	....	....	....	....	....	....	....	....	....	....	....	....
4.000	9.5	3.548	4.750	....	2.680	5.581	....	....	....	....	....	....	....	....	....	....	....	....

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TDS

Type:Coupled, non-upset			Seal: Metal-to-metal				J/K-55	L/N-80	C-90	C/T-95	MRW P-110	MRW Cr13-80	MRW Cr13-95	MRW 110-SS	MRW AF22-130	2832-100
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb									
2.375	4.6	1.901	2.875	2.700	1.304	2.239	740-920	1000-1220	1030-1250	1070-1330	1110-1400	1000-1220	1070-1330	1110-1400	....	....
2.375	5.1	1.845	2.875	2.700	1.477	2.239	770-920	1070-1290	1140-1400	1180-1480	1290-1620	1030-1290	1180-1480	1290-1620	....	....
2.375	5.8	1.773	2.875	2.700	1.692	2.239	810-960	1180-1400	1250-1550	1330-1620	1480-1840	1110-1400	1330-1620	1480-1840	....	....
2.375	6.3	1.721	2.875	2.700	1.843	2.239	850-1000	1250-1480	1330-1660	1440-1730	1620-2030	1140-1480	1440-1730	1620-2030	....	....
2.875	6.4	2.347	3.500	3.228	1.812	3.433	1100-1330	1360-1700	1480-1840	1550-1920	1770-2210	1360-1700	1550-1920	1770-2210	....	....
2.875	7.8	2.229	3.500	3.228	2.253	3.433	1290-1620	1660-2070	1840-2290	1920-2360	2070-2660	1660-2070	1920-2360	2070-2660	....	....
2.875	8.6	2.165	3.500	3.228	2.484	3.433	1440-1840	1920-2360	2140-2660	2210-2730	2360-2950	1920-2360	2210-2730	2360-2950	....	....
3.500	7.7	2.743	4.250	3.866	2.228	5.096	1840-2100	2250-2840	2360-3060	2580-3210	2880-3580	2290-2840	2580-3210	2880-3580	....	....
3.500	9.2	2.867	4.250	3.866	2.590	5.096	1920-2210	2360-2950	2430-3100	3320-2880	2950-3690	2360-2950	2660-3320	2950-3690	....	....
3.500	10.2	2.797	4.250	3.866	2.915	5.096	2140-2430	2580-3250	2660-3390	2880-3610	3320-4200	2580-3250	2880-3610	3320-4200	....	....
3.500	12.7	2.625	4.250	3.866	3.682	5.096	2360-2660	2950-3690	3470-4430	3690-4650	4500-5610	2950-3690	3690-4650	4500-5610	....	....
4.000	9.5	3.423	4.750	4.343	2.680	5.793	2210-2690	2660-3280	2950-3720	3100-3870	3470-4310	2660-3280	3100-3870	3470-4420	....	....
4.000	10.8	3.476	4.750	4.343	3.077	5.793	2290-2800	2730-3390	3020-3840	3170-3980	3540-4420	2730-3390	3170-3980	3540-4420	....	....
4.500	12.6	3.833	5.200	5.000	3.600	6.087	2660-3320	3170-3910	3320-4200	3390-4280	3980-4940	3760-4650	4070-5140	3980-4940	....	....
4.500	13.5	3.795	5.200	5.000	3.836	6.087	2800-3540	3470-4350	3840-4790	3980-4940	4350-5460	4130-5240	4780-5930	4350-5460	....	....
4.500	15.2	3.701	5.200	5.000	4.407	6.087	3390-4200	4060-5020	4350-5460	4500-5610	4870-6050	4600-5750	5220-6550	4870-6050	....	....

NKK Corporation

New NK35B

Type: Coupled, non-upset			Seal: Metal-to-metal				J/K-55	L/N-80	C-90	C/T-95	P-110	NK-AC80	NK-AC90	NK-AC95 NK-LT95	NK-AC110 NK-LT110
D	w	du	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb								
2.375	4.7	1.995	2.875	2.700	1.304	....	0.96-1.32	0.96-1.32	1.04-1.43	1.04-1.43	1.12-1.54	0.96-1.32	1.04-1.43	1.04-1.43	1.12-1.54
2.375	5.3	1.939	2.875	2.721	1.477	....	1.12-1.54	1.20-1.65	1.20-1.65	1.20-1.65	1.28-1.76	1.20-1.65	1.20-1.65	1.20-1.65	1.28-1.76
2.375	6.0	1.867	2.875	2.772	1.692	....	1.28-1.76	1.44-1.98	1.52-2.09	1.52-2.09	1.52-2.09	1.44-1.98	1.52-2.09	1.52-2.09	1.52-2.09
2.875	6.5	2.441	3.500	3.240	1.812	....	1.44-1.98	1.60-2.20	1.68-2.31	1.68-2.31	1.76-2.42	1.60-2.20	1.68-2.31	1.68-2.31	1.76-2.42
2.875	7.9	2.323	3.500	3.317	2.254	....	1.68-2.31	1.84-2.53	1.92-2.64	1.92-2.64	2.00-2.75	1.84-2.53	1.92-2.64	1.92-2.64	2.00-2.75
2.875	8.7	2.259	3.500	3.362	2.484	....	1.84-2.53	2.08-2.86	2.16-2.97	2.16-2.97	2.24-3.08	2.08-2.86	2.16-2.97	2.16-2.97	2.24-3.08
3.500	7.7	3.068	4.250	3.882	2.228	....	2.00-2.75	2.16-2.97	2.32-3.19	2.32-3.19	2.48-3.41	2.16-2.97	2.32-3.19	2.32-3.19	2.48-3.41
3.500	9.3	2.992	4.250	3.920	2.590	....	2.16-2.97	2.32-3.19	2.40-3.41	2.48-3.41	2.64-3.63	2.32-3.19	2.40-3.41	2.48-3.41	2.64-3.63
3.500	10.3	2.992	4.250	3.974	2.915	....	2.48-3.41	2.72-3.74	2.88-3.96	2.88-3.96	3.04-4.18	2.72-3.74	2.88-3.96	2.88-3.96	3.04-4.18
4.000	11.0	3.476	4.750	4.429	3.077	....	2.88-3.96	3.20-4.40	3.28-4.51	3.28-4.51	3.44-4.73	3.20-4.40	3.28-4.51	3.28-4.51	3.44-4.73
4.000	13.4	3.340	4.750	4.530	3.805	....	3.52-4.84	4.00-5.50	4.16-5.72	4.16-5.72	4.32-5.94	4.00-5.50	4.16-5.72	4.16-5.72	4.32-5.94
4.500	12.8	3.958	5.200	4.936	3.600	....	2.80-3.85	3.12-4.29	3.28-4.51	3.28-4.51	3.44-4.73	3.12-4.29	3.28-4.51	3.28-4.51	3.44-4.73
4.500	13.5	3.920	5.200	4.962	3.836	....	3.36-4.62	3.76-5.17	3.92-5.39	3.92-5.39	4.16-5.72	3.76-5.17	3.92-5.39	3.92-5.39	4.16-5.72
4.500	15.5	3.826	5.200	5.036	4.407	....	4.00-5.50	4.40-6.05	4.64-6.38	4.64-6.38	5.04-6.93	4.40-6.05	4.64-6.38	4.64-6.38	5.04-6.93

NKK Corporation

NK35B

Type: Coupled, non-upset			Seal: Metal-to-metal				J/K-55	L/N-80	C-90	C/T-95	P-110	NK-AC80	NK-AC90	NK-AC90, AC95, LT95	NK-AC110, LT-110
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb								
2.375	4.7	1.901	2.875	2.700	1.304	....	1.08-1.32	1.08-1.32	1.17-1.43	1.17-1.43	1.26-1.54	1.08-1.32	1.17-1.43	1.17-1.43	1.26-1.54
2.375	5.3	1.845	2.875	2.700	1.477	....	1.12-1.54	1.35-1.65	1.35-1.65	1.35-1.65	1.44-1.76	1.35-1.65	1.35-1.65	1.35-1.65	1.44-1.76
2.375	6.0	1.773	2.875	2.732	1.692	....	1.28-1.92	1.28-1.92	1.52-2.28	1.52-2.28	1.52-2.28	1.28-1.92	1.52-2.28	1.52-2.28	1.52-2.28
2.375	6.2	1.759	2.875	2.744	1.733	....	1.36-2.04	1.36-2.04	1.52-2.28	1.52-2.28	1.52-2.28	1.36-2.04	1.52-2.28	1.52-2.28	1.52-2.28
2.375	7.7	1.609	2.875	....	2.152	....	1.60-2.40	1.60-2.20	1.84-2.76	1.84-2.76	1.92-2.88	1.60-2.20	1.84-2.76	1.84-2.76	1.92-2.88
2.875	6.5	2.347	3.500	3.220	1.812	....	1.62-1.98	1.80-2.20	1.80-2.20	1.80-2.20	1.98-2.42	1.80-2.20	1.80-2.20	1.80-2.20	1.98-2.42
2.875	7.9	2.229	3.500	3.280	2.254	....	1.68-2.52	1.84-2.76	1.94-2.88	1.94-2.88	1.92-2.88	1.84-2.76	1.94-2.88	1.94-2.88	1.92-2.88
2.875	8.7	2.165	3.500	3.323	2.484	....	1.84-2.76	2.08-3.12	2.16-3.24	2.16-3.24	2.16-3.24	2.08-3.12	2.16-3.24	2.16-3.24	2.16-3.24
2.875	9.5	2.101	3.500	3.366	2.708	....	2.00-3.00	2.24-3.36	2.40-3.60	2.40-3.60	2.40-3.60	2.24-3.36	2.40-3.60	2.40-3.60	2.40-3.60
2.875	10.7	1.997	3.500	....	3.058	....	2.24-3.36	2.64-3.96	2.80-4.20	2.80-4.20	2.804.20	2.64-3.96	2.80-4.20	2.80-4.20	2.804.20
2.875	11.0	1.971	3.500	....	3.143	....	2.24-3.36	2.64-3.96	2.80-4.20	2.80-4.20	2.80-4.20	2.64-3.96	2.80-4.20	2.80-4.20	2.80-4.20
2.875	11.7	1.901	3.500	....	3.366	....	2.24-3.36	2.64-3.96	2.80-4.20	2.80-4.20	2.80-4.20	2.64-3.96	2.80-4.20	2.80-4.20	2.80-4.20
3.500	9.3	2.867	4.250	3.882	2.590	....	2.16-3.24	2.32-3.48	2.48-3.72	2.48-3.72	2.48-3.72	2.32-3.48	2.48-3.72	2.48-3.72	2.48-3.72
3.500	10.3	2.797	4.250	3.933	2.915	....	2.48-3.72	2.72-4.08	2.88-4.32	2.88-4.32	2.88-4.32	2.72-4.08	2.88-4.32	2.88-4.32	2.88-4.32
3.500	12.8	2.639	4.250	4.051	3.621	....	3.12-4.68	3.52-5.28	3.68-5.52	3.68-5.52	3.68-5.52	3.52-5.28	3.68-5.52	3.68-5.52	3.68-5.52
3.500	13.0	2.625	4.250	4.059	3.682	....	3.12-4.68	3.52-5.28	3.68-5.52	3.68-5.52	3.68-5.52	3.52-5.28	3.68-5.52	3.68-5.52	3.68-5.52
3.500	15.1	2.477	4.250	....	4.304	....	3.6-5.4	4.00-6.00	4.24-6.36	4.24-6.36	4.56-6.84	4.00-6.00	4.24-6.36	4.24-6.36	4.56-6.84
3.500	15.8	2.423	4.250	....	4.522	....	3.6-5.4	4.00-6.00	4.24-6.36	4.24-6.36	4.56-6.84	4.00-6.00	4.24-6.36	4.24-6.36	4.56-6.84
3.500	16.7	2.355	4.250	....	4.791	....	3.68-5.52	4.16-6.24	4.40-6.60	4.40-6.60	4.72-7.08	4.16-6.24	4.40-6.60	4.40-6.60	4.72-7.08
3.500	17.1	2.315	4.250	....	4.945	....	3.68-5.52	4.16-6.24	4.40-6.60	4.40-6.60	4.72-7.08	4.16-6.24	4.40-6.60	4.40-6.60	4.72-7.08
4.000	11.0	3.351	4.750	4.402	3.077	....	2.88-4.32	3.20-4.80	3.28-4.92	3.28-4.92	3.44-5.16	3.20-4.80	3.28-4.92	3.28-4.92	3.44-5.16
4.000	13.4	3.215	4.750	4.920	3.805	....	3.52-5.28	4.00-6.00	4.16-6.24	4.16-6.24	4.32-6.48	4.00-6.00	4.16-6.24	4.16-6.24	4.32-6.48
4.000	19.0	2.875	4.750	....	5.498	....	4.80-7.20	5.60-8.40	5.60-8.40	5.60-8.40	6.00-9.00	5.60-8.40	5.60-8.40	5.60-8.40	6.00-9.00
4.000	22.5	2.655	4.750	....	6.496	....	5.12-7.68	5.60-8.40	5.84-8.76	5.84-8.76	6.24-9.36	5.60-8.40	5.84-8.76	5.84-8.76	6.24-9.36
4.500	12.8	3.833	5.200	4.921	3.600	....	3.15-3.85	3.51-4.29	3.69-4.51	3.69-4.51	3.87-4.73	3.51-4.29	3.69-4.51	3.69-4.51	3.87-4.73
4.500	13.5	3.795	5.200	4.921	3.836	....	3.36-5.04	3.76-5.64	3.92-5.88	3.92-5.88	4.16-6.24	3.76-5.64	3.92-5.88	3.92-5.88	4.16-6.24
4.500	15.5	3.701	5.200	4.996	4.407	....	4.0-6.0	4.40-8.40	4.64-6.96	4.64-6.96	5.04-7.56	4.40-8.40	4.64-6.96	4.64-6.96	5.04-7.56
4.500	19.2	3.515	5.200	....	5.498	....	4.80-7.20	5.60-8.40	6.00-9.00	6.00-9.00	6.40-9.60	5.60-8.40	6.00-9.00	6.00-9.00	6.40-9.60
4.500	21.6	3.375	5.200	....	6.283	....	4.96-7.44	6.00-9.00	6.40-9.60	6.40-9.60	6.80-10.2	6.00-9.00	6.40-9.60	6.40-9.60	6.80-10.2
4.500	24.0	3.255	5.200	....	6.932	....	5.20-7.80	6.16-9.24	6.80-10.2	6.80-10.2	6.96-10.44	6.16-9.24	6.80-10.2	6.80-10.2	6.96-10.44
4.500	26.5	3.115	5.200	....	7.660	....	5.20-7.80	6.16-9.24	6.80-10.2	6.80-10.2	6.96-10.44	6.16-9.24	6.80-10.2	6.80-10.2	6.96-10.44

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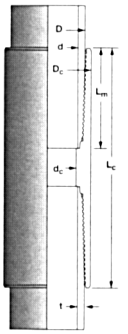
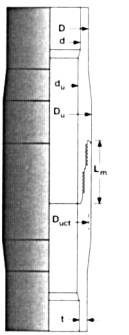
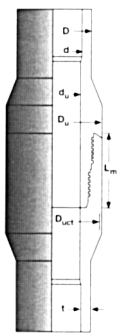


NIPPON STEEL NS-CT is a field-proven high performance threaded and coupled connection. It combines rugged buttress tubing thread form with a patented two-step pin nose and high-pressure gas-tight metal-to-metal seal, full API Pipe Body Yield Strength in tension while maintaining low hoop stress in the coupling, which is ideal for H_2S environments and recess-free bore. It has less turbulent flow. Excellent anti-gall performance for carbon and high chrome materials in API 5CT tests and the field. It is interchangeable in a size range and can be ordered with the "Standard K-Ring," "Single K1" or FGL for plastic-coated or fiber-glass-lined products.



SIDERCA SDS-RT8 integral tubing connection is designed for high pressure service, single or dual completions, and corrosive wells. Metal seals provide leak resistance, and shoulders avoid high torque damage. It is interchangeable with SDS-T8, and exceeds pipe body in tension, internal yield and collapse. Available with AC ring or special clearance.



SIDERCA SDS-T6 integral tubing connection is recommended for high pressure service. It exceeds pipe body in tension, internal yield and collapse, has a stronger torque shoulder than other SDS joints. Available with AC ring or special clearance.

Nippon Steel — NS-CT

Type: Coupled	Seal: Metal-to-metal						J/K-55	C-75	C/T-95	P-110
D	w	du	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb			
2.375	4.6	1.928	2.776	....	1.304	....	83-105	94-12	101-138	101-138
2.375	5.1	1.892	2.815	....	1.477	....	83-105	94-12	101-138	101-138
2.375	5.8	1.860	2.858	....	1.692	....	101-127	109-145	127-163	127-163
2.375	6.2	1.853	2.866	....	1.733	....	101-127	109-145	127-163	127-163
2.375	7.7	1.696	2.953	....	2.152	....	109-145	145-181	163-199	163-199
2.875	6.4	2.382	3.272	....	1.812	....	116-152	152-188	170-207	188-225
2.875	7.9	2.316	3.370	....	2.254	....	145-181	181-217	199-235	217-253
2.875	8.6	2.252	3.421	....	2.484	....	145-181	181-217	199-235	217-253
2.875	9.5	2.187	3.469	....	2.708	....	163-199	199-235	217-253	235-271
2.875	9.8	2.151	3.500	....	2.858	....	163-199	199-235	217-253	235-271
2.875	10.7	2.091	3.539	....	3.058	....	163-199	199-235	217-253	235-271
2.875	11.0	2.065	3.559	....	3.143	....	181-217	217-253	235-271	253-289
2.875	11.7	1.987	3.602	....	3.366	....	181-217	217-253	235-271	253-289
3.500	9.2	2.945	3.941	....	2.590	....	217-253	253-325	289-361	307-379
3.500	10.2	2.895	4.000	....	2.915	....	217-253	253-325	289-361	307-379
3.500	12.7	2.743	4.138	....	3.682	....	235-271	289-361	307-379	343-416
3.500	13.7	2.674	4.197	....	4.005	....	235-271	289-361	307-379	343-416
3.500	14.7	2.600	4.248	....	4.312	....	253-289	307-379	325-397	361-434
3.500	15.8	2.548	4.283	....	4.522	....	253-289	307-379	325-397	361-434
3.500	16.7	2.480	4.331	....	4.791	....	253-289	307-379	325-397	361-434
4.000	10.9	3.429	4.449	....	3.077	....	235-307	289-361	325-397	343-416
4.000	13.0	3.333	4.567	....	3.805	....	235-307	289-361	325-397	343-416
4.000	14.8	3.233	4.650	....	4.322	....	271-343	325-397	397-470	434-506
4.000	16.5	3.140	4.728	....	4.823	....	271-343	325-397	397-470	434-506
4.500	12.6	3.911	4.957	....	3.600	....	289-361	361-434	397-470	416-524
4.500	13.5	3.893	4.992	....	3.836	....	289-361	361-434	397-470	416-524
4.500	15.1	3.819	5.075	....	4.407	....	289-361	361-434	397-470	416-524
4.500	16.9	3.746	5.134	....	4.918	....	325-397	434-542	470-578	506-614
4.500	18.8	3.640	5.228	....	5.498	....	325-397	434-542	470-578	506-614
4.500	21.6	3.500	5.339	....	6.283	....	397-470	506-614	542-650	578-687
4.500	24.0	3.380	5.425	....	6.932	....	397-470	506-614	542-650	578-687

SIDERCA S.A. — SDS-RT8

Type: Integral	Seal: Metal-to-metal						J-55	C-75	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb			
2.375	4.7	1.945	2.705	2.655	1.304	1.383	1.1	1.5	1.5	1.5
2.375	5.3	1.890	2.750	2.700	1.477	1.536	1.1	1.5	1.5	1.5
2.875	6.5	2.371	3.220	3.166	1.812	1.830	1.5	2.1	2.1	2.1
3.500	9.3	2.920	3.915	3.859	2.590	2.720	2.5	3.0	3.0	3.0
3.500	10.3	2.878	3.980	3.914	2.915	2.945	2.5	3.0	3.0	3.0
4.000	11.0	3.395	4.417	4.359	3.077	3.231	3.0	3.5	3.5	3.5
4.500	12.8	3.865	4.920	4.861	3.601	3.781	3.5	4.5	4.5	4.5
4.500	13.5	3.840	4.955	4.890	3.836	3.951	3.5	4.5	4.5	4.5

SIDERCA S.A. — SDS-T6

Type: Integral	Seal: Metal-to-metal						C-75	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb		
2.375	6.0	1.805	2.906	2.782	1.693	1.845	2.2	2.2	2.7
2.375	6.2	1.795	2.938	2.794	1.733	1.872	2.2	2.2	2.7
2.375	7.7	1.645	3.125	3.002	2.152	2.282	2.2	2.2	2.7
2.875	7.9	2.265	3.438	3.312	2.254	2.434	3.0	3.0	3.5
2.875	8.7	2.200	3.500	3.365	2.484	2.658	3.0	3.0	3.5
2.875	9.5	2.130	3.625	3.419	2.708	2.897	4.5	4.5	5.5
2.875	10.7	2.030	3.688	3.595	3.058	3.211	4.5	4.5	5.5
3.500	13.0	2.687	4.313	4.189	3.686	4.381	5.5	5.5	7.0
3.500	15.8	2.485	4.500	4.474	4.522	4.793	5.5	5.5	7.0
4.000	13.4	3.275	4.625	4.514	3.160	2.223	5.5	5.5	7.0
4.500	15.5	3.765	5.125	5.021	4.407	4.716	6.0	6.0	7.5
4.500	19.2	3.560	5.313	5.170	5.498	5.883	7.5	7.5	9.5

SIDERCA S.A. — SDS-T8

Type: Integral	Seal: Metal-to-metal						J-55	L/N-80	P-110
D	w	du	Du	Duct	At	Ac	Make-up torque, 1,000 ft-lb		
2.375	4.7	1.945	2.700	2.630	1.304	n/a	1.1	1.5	1.5
2.875	6.5	2.375	3.220	3.155	1.812	n/a	1.5	2.1	2.1
3.500	9.3	2.920	3.905	3.805	2.590	n/a	2.5	3.0	3.0
4.000	11.0	3.395	4.405	4.315	3.077	n/a	3.0	3.5	3.5
4.500	12.8	3.865	4.910	4.825	3.601	n/a	3.5	4.5	4.5

SIDERCA S.A. — SEC-FR

Type: Coupled	Seal: Metal-to-metal						J-55	L/N-80	C-90, T-95	P-110	grade 125
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb				
2.375	4.6	1.995*	2.697	**	1.304	1.403	1.26	1.62	1.8	1.8	n/a
2.375	5.1	1.939*	2.697	....	1.477	1.403	1.33	1.62	1.93	1.93	n/a
2.375	5.8	1.867	2.775	....	1.693	1.738	1.62	1.62	2.25	2.25	n/a
2.875	6.4	2.441*	3.197	....	1.812	1.769	1.93	2.25	2.29	2.58	n/a
2.875	7.7	2.323	3.326	....	2.254	2.430	2.25	2.79	2.79	2.79	n/a
2.875	8.6	2.259	3.326	....	2.484	2.430	2.25	2.79	2.79	3.05	n/a
3.500	7.7	3.068*	3.803	....	2.229	2.176	2.25	2.61	3.11	3.28	n/a
3.500	9.2	2.992	3.862	....	2.590	2.532	2.25	2.92	3.96	3.96	n/a
3.500	10.2	2.922*	3.917	....	2.915	2.868	3.11	3.87	4.23	4.23	n/a
3.500	12.7	2.750	4.035	....	3.682	3.605	3.96	4.86	5.4	5.4	n/a
3.500	13.7	2.673	4.138	....	4.010	4.266	4.86	4.86	6.21	6.21	n/a
4.000	9.5	3.548*	4.325	....	2.680	2.733	2.35	3.23	3.75	4.22	n/a
4.000	10.9	3.476	4.366	....	3.077	3.013	2.47	3.34	3.87	4.39	n/a
4.000	13.0	3.340	4.468	....	3.805	3.720	3.24	3.87	4.45	5.04	n/a
4.000	14.8	3.240	4.606	....	4.322	4.704	3.96	4.86	5.62	6.45	n/a

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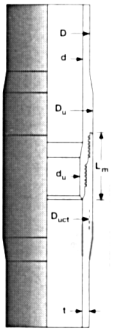
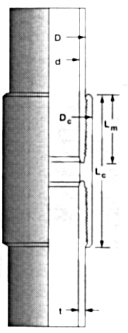
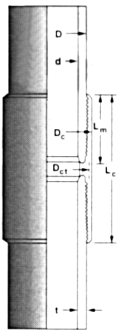


SIDERCA SDS-T8 integral tubing connection is used for moderate depth wells, completions and workover strings. It is interchangeable with SDS-RT8 and ensures fast make-up, pressure integrity and minimum galling. Available with AC ring or special clearance.



SIDERCA SEC-FR connection is ideally suited for sour service because of its positive seal feature. Full thread run-out ensures 100% efficiency. Wide stop shoulder provides a solid stop to prevent over torquing and leak resistance under extreme service conditions.



SIDERCA SEC-ST is a premium, non-upset joint designed to resist jump-outs and reduce chances cross-threading. Thread run-out to pin OD maximizes cross section strength to ensure joint integrity. OD is smaller than equivalent API connection. Where clearance is critical, special clearances are recommended.

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SEC-FR (continued)

Type: Coupled		Seal: Metal-to-metal					J-55		L/N-80 C-90, T-95 P-110 grade 125		
D	w	d	Dc	Dct	At	Ac			Make-up torque, 1,000 ft-lb		
4.500	10.5	4.052*	4.862	....	3.009	3.516	3.6	3.73	4.22	4.75	n/a
4.500	11.6	4.000*	4.862	....	3.338	3.516	3.96	3.96	4.34	4.86	n/a
4.500	12.6	3.958	4.862	....	3.601	3.516	3.96	3.96	4.45	4.99	n/a
4.500	13.5	3.920	4.960	....	3.836	4.272	3.96	4.59	4.59	5.17	n/a
4.500	15.1	3.826	4.960	....	4.407	4.272	4.59	4.86	5.39	6.16	n/a
4.500	16.9	3.740	5.106	....	4.919	5.426	5.58	5.62	6.45	7.33	n/a
4.500	18.8	3.640	5.106	....	5.498	5.426	5.58	5.75	6.72	7.61	n/a

*du value is less than d value.
** Special clearance or turned available on request.

SIDERCA S.A.

SEC-ST

Type: Coupled		Seal: Metal-to-metal					J-55		L/N-80 C-90, T-95 P-110 Grade 125		
D	w	d	Dc	Dct	At	Ac			Make-up torque, 1,000 ft-lb		
2.375	4.6	1.995*	2.697	**	1.304	1.403	1.4	1.8	2.0	2.0	n/a
2.375	5.1	1.939*	2.697	....	1.477	1.403	1.48	1.8	2.15	2.15	n/a
2.375	5.8	1.867	2.775	....	1.693	1.738	1.8	1.8	2.5	2.5	n/a
2.875	6.4	2.441*	3.197	....	1.812	1.769	2.15	2.5	2.54	2.87	n/a
2.875	7.7	2.323	3.326	....	2.254	2.430	2.5	3.1	3.1	3.1	n/a
2.875	8.6	2.259	3.326	....	2.484	2.430	2.5	3.1	3.1	3.39	n/a
3.500	7.7	3.068*	3.803	....	2.229	2.176	2.5	2.9	3.45	3.65	n/a
3.500	9.2	2.992	3.862	....	2.590	2.532	2.5	3.25	4.4	4.4	n/a
3.500	10.2	2.922	3.917	....	2.915	2.868	3.45	4.3	4.7	4.7	n/a
3.500	12.7	2.750	4.035	....	3.682	3.605	4.4	5.4	6.0	6.0	n/a
3.500	13.7	2.673	4.138	....	4.010	4.266	5.4	5.4	6.9	6.9	n/a
4.000	9.5	3.548*	4.325	....	2.680	2.733	2.61	3.59	4.17	4.69	n/a
4.000	10.9	3.476	4.366	....	3.077	3.013	2.74	3.71	4.3	4.88	n/a
4.000	13.0	3.340	4.468	....	3.805	3.720	3.6	4.3	4.95	5.6	n/a
4.000	14.8	3.240	4.606	....	4.322	4.704	4.4	5.4	6.25	7.17	n/a
4.500	10.5	4.052*	4.862	....	3.009	3.516	4.0	4.15	4.69	5.28	n/a
4.500	11.6	4.000*	4.862	....	3.338	3.516	4.4	4.4	4.82	5.4	n/a
4.500	12.6	3.958	4.862	....	3.601	3.516	4.4	4.4	4.95	5.54	n/a
4.500	13.5	3.920	4.960	....	3.836	4.272	4.4	5.1	5.1	5.74	n/a
4.500	15.1	3.826	4.960	....	4.470	4.272	5.1	5.4	5.99	6.84	n/a
4.500	16.9	3.740	5.106	....	4.919	5.426	6.2	6.25	7.17	8.15	n/a
4.500	18.8	3.640	5.106	....	5.498	5.426	6.2	6.39	7.47	8.46	n/a

*du value is less than the d value.
** Special clearance or turned available on request.

Smith Fiberglass Products

SDT

SDT 1010	Type: Threaded & coupled or integral			Seal: Threaded		Rating	Ultimate
D	w	d	Dc	Dct	At/Ac	Min. tensile strength, 1,000 lb	
1.720	0.6	1.500	2.500	....	....	6.2	21.0
2.480	1.1	2.160	3.000	....	....	9.2	30.6
2.790	1.5	2.430	3.500	....	....	12.5	40.7
3.640	2.2	3.190	4.300	....	....	20.5	65.1
4.540	3.4	4.000	5.300	....	....	29.0	90.0
6.900	7.6	6.060	7.800	....	....	48.0	147.0

SDT 1510	Type: Threaded & coupled or integral			Seal: Threaded		Rating	Ultimate
D	w	d	Dc	Dct	At/Ac	Min. tensile strength, 1,000 lb	
1.770	0.7	1.500	2.700	....	....	6.9	24.0
2.380	1.2	2.000	3.300	....	....	11.7	41.4
2.890	1.8	2.430	3.900	....	....	15.9	49.7
3.510	2.5	3.000	4.600	....	....	23.2	78.4
4.640	3.9	4.000	5.800	....	....	33.0	103.0
6.900	9.4	5.840	8.200	....	....	55.5	167.0

SDT 2010	Type: Threaded & coupled or integral			Seal: Threaded		Rating	Ultimate
D	w	d	Dc	Dct	At/Ac	Min. tensile strength, 1,000 lb	
1.870	0.9	1.500	2.700	....	....	9.3	31.1
2.500	1.6	2.000	3.300	....	....	15.4	46.2
2.980	2.1	2.430	3.900	....	....	18.1	54.5
3.640	3.0	3.000	4.600	....	....	26.1	83.4
4.550	4.8	3.750	5.800	....	....	36.0	108.7

SDT 2510	Type: Threaded & coupled or integral			Seal: Threaded		Rating	Ultimate
D	w	d	Dc	Dct	At/Ac	Min. tensile strength, 1,000 lb	
1.980	1.2	1.500	2.700	....	....	11.1	33.3
2.420	1.7	1.880	3.300	....	....	16.2	48.7
2.850	2.3	2.230	3.900	....	....	19.9	59.8
3.510	3.5	2.730	4.600	....	....	28.3	85.1
4.310	5.4	3.350	5.800	....	....	38.3	115.1

SDT 2510	Type: Threaded & coupled or integral			Seal: Threaded		Rating	Ultimate
D	w	d	Dc	Dct	At/Ac	Min. tensile strength, 1,000 lb	
2.040	1.3	1.500	2.700	....	....	11.5	35.2
2.500	1.9	1.880	3.500	....	....	16.9	50.7
2.980	2.8	2.230	4.000	....	....	20.1	60.4
3.640	4.1	2.730	4.900	....	....	28.9	86.5
4.650	5.6	3.350	6.300	....	....	46.6	140.0

Star Fiber Glass Systems

Advanced composite thread

Type: Threaded and coupled		Seal: Thread					Tensile strength, 1,000 lb		Pressure
D	w	d	Dc	Dct	At	Ac	Rating	Ultimate	rating, psi
1.710	0.6	1.380	2.800	....	....	....	5.0	20.0	1,500.0
1.780	0.9	1.380	2.800	....	....	....	7.5	25.0	2,000.0
1.850	1.0	1.380	2.900	....	....	....	10.0	25.0	2,500.0
1.880	1.1	1.380	3.050	....	....	....	11.0	30.0	3,000.0
1.990	1.3	1.380	3.150	....	....	....	13.0	35.0	3,500.0
2.160	1.4	1.380	3.300	....	....	....	15.0	40.0	4,000.0
2.160	0.8	1.880	3.250	....	....	....	6.0	25.0	1,000.0
2.310	1.2	1.880	3.250	....	....	....	11.5	42.0	1,500.0
2.340	1.3	1.880	3.400	....	....	....	12.0	43.0	1,750.0

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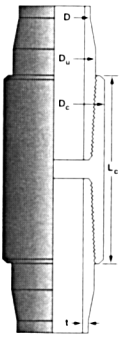
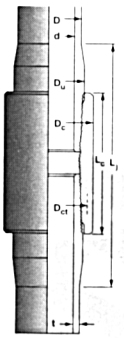
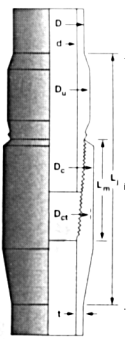


SMITH FIBERGLASS PRODUCTS SDT fiberglass tubing is an external upset coupled connection manufactured with conventional API 8RD EUE long form threads that enable direct connection to packers and tools without the need for adaptors. Precision-formed threads are self-sealing when assembled with teflon-filled thread lubricant precluding the need for O-rings or other secondary seal. Highly corrosion resistant. It is engineered to bear normal downhole tensile loads and internal pressure up to 3,000 psig.



STAR FIBER GLASS SYSTEMS ACT COUPLED casing features premium molded API 8RD EUE long form threaded and coupled connection. Threads are molded for smooth, sealed, corrosion-resistant thread surface with graphite and ceramic reinforcement, which provides lower breakout torque values. Precison threads use graphite as an added lubricant to avoid damage and wear. It is designed and manufactured to resist creep, maximze tensile strength and guarantee breakout. Laminate handles up to 4,000 psi at 200°F.



STAR FIBER GLASS SYSTEMS ACT INTEGRAL casing features premium molded API 8RD EUE long form integral joint connection. Threads are molded for smoother, sealed, corrosion-resistant thread surface with graphite and ceramic reinforcement, which provide lower breakout torque values. Precision threads use graphite as an added lubricant to avoid thread damage and wear. It is designed and manufactured to resist creep, maximize tensile strength and guarantee breakout. Laminate handles up to 4,000 psi at 200°F.

Advanced composite thread (continued)

Type: Threaded and coupled		Seal: Thread					Tensile strength, 1,000 lb		Pressure
D	w	d	Dc	Dct	At	Ac	Rating	Ultimate	rating, psi
2.380	1.4	1.880	3.400	....	....	....	14.5	46.0	2,000.0
2.500	1.8	1.880	3.600	....	....	....	17.0	47.0	2,500.0
2.540	1.9	1.880	3.700	....	....	....	20.0	50.0	3,000.0
2.600	2.1	1.880	3.900	....	....	....	21.5	53.0	3,500.0
2.630	2.2	1.880	4.100	....	....	....	23.0	56.0	4,000.0
2.650	1.2	2.300	3.800	....	....	....	11.0	50.0	1,000.0
2.750	1.5	2.300	3.800	....	....	....	14.0	55.0	1,500.0
2.760	1.6	2.300	4.000	....	....	....	16.0	56.0	1,750.0
2.820	1.8	2.300	4.000	....	....	....	18.0	58.0	2,000.0
2.950	2.3	2.300	4.200	....	....	....	22.0	60.0	2,500.0
3.050	2.7	2.300	4.400	....	....	....	26.5	65.0	3,000.0
3.090	2.8	2.300	4.600	....	....	....	30.0	68.0	3,500.0
3.230	3.7	2.300	5.750	....	....	....	37.0	75.0	4,000.0
3.270	1.6	2.890	4.600	....	....	....	14.0	63.0	1,000.0
3.300	2.1	2.890	4.600	....	....	....	18.5	71.0	1,500.0
3.410	2.2	2.890	4.800	....	....	....	21.0	72.0	1,750.0
3.510	2.6	2.890	4.800	....	....	....	25.0	74.0	2,000.0
3.580	3.0	2.890	5.100	....	....	....	30.0	80.0	2,500.0
3.740	3.7	2.890	5.250	....	....	....	36.5	88.0	3,000.0
3.870	5.1	2.890	7.000	....	....	....	44.0	115.0	3,500.0
3.970	5.6	2.890	7.200	....	....	....	51.0	120.0	4,000.0
3.790	2.4	3.310	5.000	4.600	....	....	20.0	80.0	1,000.0
3.860	2.7	3.310	5.000	4.600	....	....	25.0	85.0	1,500.0
3.960	3.2	3.310	5.250	4.600	....	....	30.0	85.0	1,750.0
3.990	3.3	3.310	5.250	4.600	....	....	34.0	90.0	2,000.0
4.140	4.1	3.310	5.550	....	....	....	40.0	90.0	2,500.0
4.120	4.5	3.310	5.850	....	....	....	45.0	90.0	3,000.0
4.300	5.5	3.310	7.000	....	....	....	50.0	110.0	3,500.0
4.430	6.2	3.310	7.200	....	....	....	55.0	110.0	4,000.0
4.370	2.8	3.890	5.800	....	....	....	24.0	95.0	1,000.0
4.530	3.6	3.890	5.800	....	....	....	34.0	95.0	1,500.0
4.570	3.9	3.890	6.100	....	....	....	38.0	100.0	1,750.0
4.690	4.8	3.890	6.100	....	....	....	45.0	100.0	2,000.0
4.810	5.3	3.890	6.400	....	....	....	55.0	110.0	2,500.0

Star Fiber Glass Systems

Advanced composite thread

Type: Integral joint		Seal: Thread					Tensile strength, 1,000 lb		Pressure
D	w	d	Dc	Dct	At	Ac	Rating	Ultimate	rating, psi
1.710	0.7	1.380	2.600	....	....	....	5.0	20.0	1,500.0
1.780	0.8	1.380	2.600	....	....	....	7.5	25.0	2,000.0
1.850	1.0	1.380	2.800	....	....	....	10.0	25.0	2,500.0
1.880	1.1	1.380	3.000	....	....	....	11.0	30.0	3,000.0
1.990	1.3	1.380	3.200	....	....	....	13.0	35.0	3,500.0
2.020	1.4	1.380	3.300	....	....	....	15.0	40.0	4,000.0
2.160	0.7	1.880	3.100	....	....	....	6.0	25.0	1,000.0
2.310	1.1	1.880	3.200	....	....	....	11.5	42.0	1,500.0
2.340	1.2	1.880	3.300	....	....	....	12.0	43.0	1,750.0

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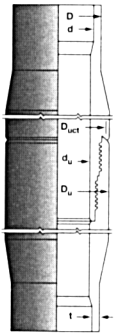
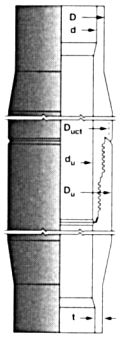
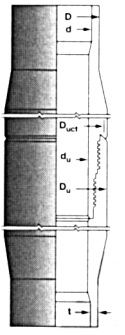
1996 Tubular Design Tables: Part I



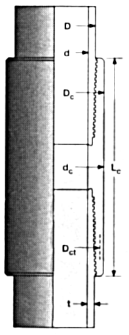
TPS TECHNITUBE TPS MULTISEAL-TS-4 is a high-performance, premium, two-step integral joint connection for high pressure service. Available with medium and heavy-weight tubing. Thread profile with multiple metal-to-metal seals and torque shoulders utilizes four threads per inch. Increased upset length guarantees 90% repairability by recutting in case of thread damage.



TPS-TECHNITUBE TPS-MULTISEAL-TS6 is a high performance two-step integral connection for high pressure service, and medium and heavy weights of tubing. Two-step non-interference thread profile with multiple metal-to-metal pressure seals and torque shoulders uses a thread pitch of 6 threads per in. Increased upset length guarantees 90% repairability by recutting in case of thread damage. TS6-TR version includes a teflon ring.



TPS-TECHNITUBE TPS-MULTISEAL-TS8 is a high performance premium two-step integral joint connection for high pressure service and standard weight tubing. Thread profile incorporates multiple pressure seals and torque shoulders for optimum sealing integrity, easy stabbing and fast make-up. Tension, yield and collapse strength exceed tube body. Increased upset length guarantees 90% repairability by recutting in case of thread damage. TS8-TR version includes a teflon ring.



TPS-TECHNITUBE TPS-TECHNISEAL is a high-performance non-upset tubing and casing coupling with buttress type threads, high-compression tapered metal-to-metal seal and reverse angle shoulder. Full pipe strength is provided for tension, compression, bending, and internal and external pressures. It will withstand repeated make/break and is fast running, and flush ID minimizes corrosion/erosion. It is also recommended for high-strength and special alloy materials.

Advanced composite thread (continued)

Type: Integral joint	Seal: Thread						Tensile strength, 1,000 lb		Pressure
D	w	d	Dc	Dct	At	Ac	Rating	Ultimate	rating, psi
2.380	1.3	1.880	3.400	....	....	....	14.5	46.0	2,000.0
2.500	1.7	1.880	3.500	....	....	....	17.0	47.0	2,500.0
2.540	1.9	1.880	3.700	....	....	....	20.0	50.0	3,000.0
2.600	2.1	1.880	3.850	....	....	....	21.5	53.0	3,500.0
2.630	2.2	1.880	4.000	....	....	....	23.0	56.0	4,000.0
2.650	1.1	2.300	3.600	....	....	....	11.0	50.0	1,000.0
2.750	1.4	2.300	3.800	....	....	....	14.0	55.0	1,500.0
2.760	1.5	2.300	3.900	....	....	....	16.0	56.0	1,700.0
2.820	1.7	2.300	4.000	....	....	....	18.0	58.0	2,000.0
2.950	2.2	2.300	4.200	....	....	....	22.0	60.0	2,500.0
3.050	2.6	2.300	4.400	....	....	....	26.5	65.0	3,000.0
3.090	2.8	2.300	4.800	....	....	....	30.0	68.0	3,500.0
3.270	1.5	2.890	4.300	....	....	....	14.0	83.0	1,000.0
3.380	1.9	2.890	4.450	....	....	....	18.5	71.0	1,500.0
3.410	2.0	2.890	4.500	....	....	....	21.0	72.0	1,750.0
3.510	2.5	2.890	4.700	....	....	....	25.0	74.0	2,000.0
3.580	2.9	2.890	4.900	....	....	....	30.0	80.0	2,500.0
3.740	3.6	2.890	5.100	....	....	....	36.5	88.0	3,000.0
4.370	2.5	3.890	5.600	....	....	....	24.0	95.0	1,000.0
4.530	3.4	3.890	5.800	....	....	....	34.0	95.0	1,500.0
4.570	3.7	3.890	6.000	....	....	....	38.0	100.0	1,750.0
4.690	4.4	3.890	6.200	....	....	....	45.0	100.0	2,000.0
4.810	5.3	3.890	6.500	....	....	....	55.0	110.0	2,500.0

TPS Technitube Rôhrenwerke

TPS-Multiseal-TS 6 / TS 6 TR

Type: Integral	Seal: Metal-to-metal						C-75	L/N-80	C-95	P-110
D	w	du	Du	Duct	At	Ac, reg. Du	Make-up torque, 1,000 ft-lb			
2.375	6.0	1.805	2.906	2.782	1.692	>At	2.20-2.75	2.20-2.75	2.50-3.13	2.70-3.38
2.375	6.2	1.795	2.938	2.794	1.733	>At	2.20-2.75	2.20-2.75	2.50-3.13	2.70-3.38
2.375	7.7	1.645	3.125	2.924	2.152	>At	2.20-2.75	2.20-2.75	2.50-3.13	2.70-3.38
2.875	7.9	2.265	3.438	3.312	2.254	>At	3.00-3.75	3.00-3.75	3.30-4.13	3.50-4.38
2.875	8.7	2.200	3.500	3.365	2.484	>At	3.00-3.75	3.00-3.75	3.30-4.13	3.50-4.38
2.875	9.5	2.130	3.625	3.419	2.708	>At	4.50-5.63	4.50-5.63	5.10-6.38	5.50-6.88
2.875	10.7	2.030	3.688	3.509	3.058	>At	4.50-5.63	4.50-5.63	5.10-6.38	5.50-6.88
3.500	13.0	2.687	4.313	4.189	3.682	>At	5.50-6.88	5.50-6.88	6.40-8.00	7.00-8.75
3.500	15.8	2.485	4.500	4.367	4.522	>At	5.50-6.88	5.50-6.88	6.40-8.00	7.00-8.75
4.000	13.4	3.275	4.625	4.514	3.805	>At	5.50-6.88	5.50-6.88	6.40-8.00	7.00-8.75
4.500	15.5	3.765	5.125	5.021	4.407	>At	6.00-7.50	6.00-7.50	6.90-8.63	7.50-9.38
4.500	19.2	3.560	5.313	5.170	5.498	>At	7.50-9.38	7.50-9.38	8.70-10.88	9.50-11.88

TPS Technitube Rôhrenwerke

TPS-Multiseal-TS 4

Type: Integral	Seal:Metal-to-metal						J/K-55	C-75	L/N-80	C-95	P-110
D	w	du	Du	Duct	At	Ac, reg. Du	Make-up torque, 1,000 ft-lb				
5.000	18.0	4.196	5.515	....	5.275	> At	5.00-5.75	6.50-7.48	6.90-7.94	8.10-9.32	9.20-10.58
5.000	20.3	4.104	5.585	....	5.886	> At	5.20-5.98	6.70-7.71	7.10-8.17	8.30-9.55	9.40-10.81
5.000	23.2	3.964	5.700	....	6.791	> At	6.90-7.94	8.90-10.24	9.50-10.93	11.00-12.65	12.50-14.38
5.000	27.0	3.800	5.835	....	7.811	> At	7.30-8.40	9.40-10.81	9.90-11.39	11.40-13.11	12.90-14.81
5.500	17.0	4.812	5.920	....	4.962	> At	4.20-4.83	5.50-6.33	5.80-6.67	6.80-7.82	7.70-8.86
5.500	20.0	4.698	6.005	....	5.828	> At	6.20-7.13	8.00-9.20	8.50-9.78	9.90-11.39	11.20-12.88
5.500	23.0	4.590	6.090	....	6.630	> At	6.50-7.48	8.30-9.55	8.80-10.12	10.20-11.73	11.60-13.34
5.500	26.0	4.468	6.185	....	7.513	> At	8.50-9.78	10.90-12.54	11.50-13.23	13.40-15.41	15.20-17.48
5.500	28.4	4.360	6.275	....	8.275	> At	8.80-10.12	11.30-13.00	11.90-13.69	13.70-15.76	15.60-17.94

TPS Technitube Rôhrenwerke

TPS-Multiseal-TS 8/TS 8 TR

Type: Integral	Seal: Metal-to-metal						J-55	C-75	L/N-80	C-95	P-110
D	w	du	Du	Duct	At	Ac, reg. Du	Make-up torque, 1,000 ft-lb				
1.050	1.2	0.687	1.327	1.300	0.333	>At	0.20-0.25	0.30-0.375	0.30-0.375	0.30-0.375	0.30-0.375
1.050	1.5	0.687	1.327	....	0.433	>At	0.20-0.25	0.30-0.375	0.30-0.375	0.30-0.375	0.30-0.375
1.315	1.8	0.970	1.552	1.525	0.494	>At	0.30-0.375	0.40-0.50	0.40-0.50	0.40-0.50	0.40-0.50
1.315	2.3	0.864	1.600	....	0.639	>At	0.30-0.375	0.40-0.50	0.40-0.50	0.40-0.50	0.40-0.50
1.660	2.4	1.312	1.883	1.858	0.669	>At	0.40-0.50	0.60-0.75	0.60-0.75	0.60-0.75	0.60-0.75
1.660	3.0	1.218	1.927	....	0.881	>At	0.40-0.50	0.60-0.75	0.60-0.75	0.60-0.75	0.60-0.75
1.660	3.2	1.200	1.927	....	0.909	>At	0.40-0.50	0.60-0.75	0.60-0.75	0.60-0.75	0.60-0.75
1.900	2.9	1.530	2.113	2.094	0.799	>At	0.60-0.75	0.80-1.00	0.80-1.00	0.80-1.00	0.80-1.00
1.900	3.6	1.440	2.162	....	1.068	>At	0.60-0.75	0.80-1.00	0.80-1.00	0.80-1.00	0.80-1.00
1.900	4.2	1.390	2.179	....	1.157	>At	0.60-0.75	0.80-1.00	0.80-1.00	0.80-1.00	0.80-1.00
2.063	3.3	1.700	2.330	2.295	0.935	>At	0.70-0.875	0.90-1.125	0.90-1.125	0.90-1.125	0.90-1.125
2.063	4.5	1.550	2.460	2.407	1.299	>At	0.70-0.875	0.90-1.125	0.90-1.125	0.90-1.125	0.90-1.125
2.375	4.7	1.945	2.700	2.655	1.304	>At	1.10-1.375	1.50-1.88	1.50-1.88	1.50-1.88	1.50-1.88
2.375	5.3	1.890	2.750	2.700	1.477	>At	1.10-1.375	1.50-1.88	1.50-1.88	1.50-1.88	1.50-1.88
2.875	6.5	2.371	3.210	3.166	1.812	>At	1.50-1.88	2.10-2.63	2.10-2.63	2.10-2.63	2.10-2.63
3.500	9.3	2.920	3.915	3.859	2.590	>At	2.50-3.13	3.00-3.75	3.00-3.75	3.00-3.75	3.00-3.75
3.500	10.3	2.870	3.980	3.914	2.590	>At	2.50-3.13	3.00-3.75	3.00-3.75	3.00-3.75	3.00-3.75
4.000	11.0	3.395	4.417	4.359	3.077	>At	3.00-3.75	3.50-4.38	3.50-4.38	3.50-4.38	3.50-4.38
4.500	12.8	3.865	4.920	4.861	3.600	>At	3.50-4.38	4.50-5.63	4.50-5.63	4.50-5.63	4.50-5.63
4.500	13.5	3.840	4.955	4.890	3.836	>At	3.50-4.38	4.50-5.63	4.50-5.63	4.50-5.63	4.50-5.63

TPS Technitube Rôhrenwerke

TPS-Non-Upset Optiflow

Type: Non-upset, coupled			Seal: Threaded seal type				J-55	C-75	L-80	N-80	C-95	P-110
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb					
1.900	2.8	1.610	2.200	....	0.799	> At	0.31-0.51	0.41-0.68	0.42-0.70	0.43-0.71	0.48-0.80	0.57-0.95
2.375	4.6	1.995	2.875	....	1.304	> At	0.55-0.91	0.72-1.20	0.74-1.24	0.77-1.28	0.86-1.43	1.01-1.68
2.375	5.8	1.867	2.875	....	1.692	> At	0.79-1.31	1.04-1.73	1.07-1.78	1.10-1.83	1.23-2.05	1.44-2.40
2.875	6.4	2.441	3.500	....	1.812	> At	0.79-1.31	1.04-1.73	1.07-1.78	1.10-1.84	1.24-2.06	1.46-2.43
2.875	7.8	2.323	3.500	....	2.254	> At	1.06-1.76	1.39-2.31	1.44-2.39	1.47-2.45	1.65-2.75	1.94-3.24
2.875	8.6	2.259	3.500	....	2.484	> At	1.19-1.99	1.57-2.61	1.62-2.70	1.66-2.76	1.87-3.11	2.19-3.65
3.500	9.2	2.992	4.250	....	2.590	> At	1.11-1.85	1.46-2.44	1.52-2.54	1.55-2.59	1.76-2.93	2.06-3.44
3.500	10.2	2.922	4.250	....	2.915	> At	1.29-2.15	1.70-2.84	1.77-2.95	1.81-3.01	2.04-3.40	2.39-3.99
3.500	12.7	2.750	4.250	....	3.682	> At	1.73-2.88	2.27-3.79	2.36-3.93	2.41-4.01	2.72-4.54	3.19-5.31
4.000	9.5	3.548	4.750	....	2.680	> At	0.93-1.55	1.23-2.05	1.28-2.14	1.41-2.34	1.48-2.46	1.74-2.90
4.000	13.2	3.340	4.750	....	3.805	> At	1.52-2.53	2.00-3.34	2.09-3.48	0.0	2.41-4.01	2.82-4.70
4.500	12.6	3.958	5.200	....	3.600	> At	1.31-2.18	1.73-2.88	1.80-3.00	1.83-3.05	2.09-3.48	2.44-4.06

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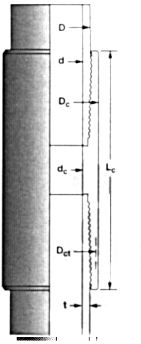
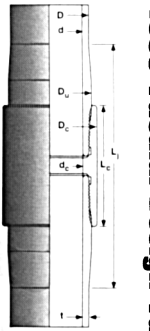
TPS Technitube Röhrenwerke

TPS-External-Upset Optiflow

Type: Upset, coupled		Seal: Threaded seal type					J-55	C-75	L-80	N-80	C-95	P-110
D	w	d	Dc	Dct	At	Ac	Make-up torque, 1,000 ft-lb					
1.900	2.9	1.610	2.500	....	0.799	> At	0.66-1.10	0.86-1.44	0.89-1.49	0.92-1.53	1.02-1.70	1.20-2.00
2.375	4.7	1.995	3.063	2.910	1.304	> At	0.97-1.61	1.28-2.13	1.32-2.20	1.35-2.25	1.52-2.54	1.79-2.98
2.375	6.0	1.867	3.063	....	1.692	> At	1.21-2.01	1.59-2.65	1.64-2.74	1.68-2.80	1.89-3.15	2.22-3.70
2.875	6.5	2.441	3.668	3.460	1.812	> At	1.24-2.06	1.63-2.71	1.69-2.81	1.73-2.88	1.95-3.25	2.28-3.80
2.875	7.9	2.323	3.668	....	2.254	> At	1.49-2.49	1.96-3.27	2.03-3.39	2.08-3.47	2.34-3.90	2.75-4.59
2.875	8.7	2.259	3.668	....	2.484	> At	1.62-2.70	2.14-3.56	2.21-3.69	2.27-3.78	2.55-4.25	2.99-4.99
3.500	9.3	2.992	4.500	4.180	2.590	> At	1.71-2.85	2.26-3.76	2.35-3.91	2.40-4.00	2.72-4.53	3.18-5.30
3.500	13.0	2.750	4.500	....	3.682	> At	2.30-3.83	3.03-5.05	3.15-5.25	3.22-5.36	3.64-6.06	4.26-7.10
4.000	11.0	3.476	5.000	....	3.077	> At	1.92-3.20	2.54-4.24	2.65-4.41	2.70-4.50	3.06-5.10	3.59-5.98
4.500	12.8	3.958	5.563	....	3.600	> At	2.15-3.58	2.84-4.73	2.96-4.93	3.02-5.03	3.42-5.70	4.01-6.68





TPS-TECHNITUBE TPS-TECHNISEAL is a high-performance non-upset tubing and casing coupling with buttress type threads, high-compression tapered metal-to-metal seal and reverse angle shoulder. Full pipe strength is provided for tension, compression, bending, and internal and external pressures. It will withstand repeated make/break and is fast running, and flush ID minimizes corrosion/erosion. It is also recommended for high-strength and special alloy materials.

TPS-TECHNITUBE TPS-OPTIFLOW couplings for standard API EUE and NUE tubing are gas-tight and eliminate flow turbulence, particularly on internally plastic-coated tubing. Modified, closer tolerance API 8RD threads incorporate pin-to-pin recess cross bridge for of interior surface and coating continuity. Two profiled HG-seal rings placed in special profiled grooves in coupling thread profiles protect against corrosive attacks.

TPS Technitube Röhrenwerke

TPS-Techniseal

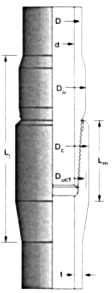
Type: Coupled		Seal: Metal-to-metal					J-55	C-75	L/N-80	C-90 C/T-95	P-110
D	w	d	Dc	Dct	At	Ac,reg.Du	Make-up torque, 1,000 ft-lb				
2.375	4.6	1.995*	2.707	2.628	1.304	1.393	1.05-1.27	1.44-1.74	1.44-1.74	1.63-1.99	1.83-2.23
2.375	5.1	1.939	2.736	2.628	1.477	1.520	1.05-1.27	1.44-1.74	1.44-1.74	1.70-2.06	1.89-2.31
2.375	5.8	1.867	2.785	2.707	1.692	1.733	1.11-1.35	1.50-1.82	1.50-1.82	1.76-2.14	1.96-2.38
2.875	6.4	2.441*	3.240	3.159	1.812	1.925	1.57-1.91	2.16-2.62	2.16-2.62	2.54-3.10	2.87-3.49
2.875	7.7	2.323	3.337	3.274	2.254	2.424	1.70-2.06	2.28-2.78	2.28-2.78	2.61-3.17	3.00-3.66
2.875	8.6	2.259	3.364	3.274	2.484	2.568	1.89-2.31	2.54-3.10	2.54-3.10	2.93-3.57	3.39-4.13
2.875	9.8	2.151	3.435	3.337	2.858	2.946	2.16-2.62	2.93-3.57	2.93-3.57	3.39-4.13	3.85-4.69
3.500	7.7	3.068*	3.841	....	2.228	2.319	2.08-2.54	2.80-3.42	2.80-3.42	3.26-3.98	3.65-4.45
3.500	9.2	2.992	3.900	3.803	2.590	2.677	2.16-2.62	2.93-3.57	2.93-3.57	3.39-4.13	3.85-4.69
3.500	10.2	2.922	3.961	3.862	2.915	3.053	2.42-2.94	3.33-4.05	3.33-4.05	3.85-4.69	4.37-5.33
3.500	12.7	2.750	4.079	3.961	3.682	3.799	2.87-3.49	3.85-4.69	3.85-4.69	4.43-5.41	5.02-6.12
3.500	13.7	2.674	4.138	4.045	4.005	4.180	3.33-4.05	4.50-5.48	4.50-5.48	5.22-6.36	5.93-7.23
3.500	14.7	2.600	4.193	4.045	4.312	4.541	3.85-4.69	5.28-6.44	5.28-6.44	5.86-7.16	6.84-8.34
3.500	15.8	2.548	4.211	4.138	4.522	4.659	3.91-4.77	5.34-6.52	5.34-6.52	5.86-7.16	6.84-8.34
4.000	9.5	3.548*	4.348	....	2.680	2.788	2.61-3.17	3.59-4.37	3.59-4.37	4.17-5.09	4.69-5.73
4.000	10.9	3.476	4.407	4.327	3.077	3.194	2.74-3.34	3.71-4.53	3.71-4.53	4.30-5.24	4.88-5.96
4.000	13.0	3.340	4.516	4.366	3.805	3.954	3.13-3.81	4.30-5.24	4.30-5.24	4.95-6.05	5.60-6.84
4.000	14.8	3.240	4.606	4.469	4.322	4.602	3.91-4.77	5.40-6.60	5.40-6.60	6.25-7.63	7.17-8.75
4.000	16.5	3.140	4.656	....	4.823	4.960	4.04-4.92	5.48-6.68	5.48-6.68	6.39-7.79	7.17-8.75
4.500	10.5	4.052*	4.862	4.813	3.009	3.422	3.06-3.74	4.04-4.92	4.04-4.92	4.69-5.73	5.28-6.44
4.500	11.6	4.000*	4.862	4.813	3.338	3.422	3.13-3.81	4.17-5.09	4.17-5.09	4.82-5.88	5.40-6.60
4.500	12.6	3.958	4.892	4.813	3.600	3.649	3.19-3.89	4.30-5.24	4.30-5.24	4.95-6.05	5.54-6.76
4.500	13.5	3.920	4.961	4.813	3.836	4.182	3.33-4.05	4.43-5.41	4.43-5.41	5.08-6.20	5.74-7.00
4.500	15.1	3.826	5.010	4.892	4.407	4.566	3.78-4.62	5.22-6.36	5.22-6.36	5.99-7.31	6.84-8.34
4.500	16.9	3.740	5.106	....	4.918	5.333	4.56-5.56	6.25-7.63	6.25-7.63	7.17-8.75	8.15-9.95
4.500	18.8	3.640	5.146	....	5.498	5.650	4.69-5.73	6.39-7.79	6.39-7.79	7.47-9.13	8.46-10.34
4.500	21.6	3.500	5.280	....	6.283	6.746	5.54-6.76	7.83-9.57	7.83-9.57	9.15-11.15	10.85-13.05
4.500	24.6	3.380	5.333	....	6.932	7.189	5.67-6.91	8.15-9.95	8.15-9.95	9.50-11.55	10.85-13.05

*du value is less than the d value

Tubular Fiberglass Company

RED BOX

Type: 8 round, integral joint		Seal: Sealing thread					All tubing	All casing	Joint tensile strength, lb
D	w	d	Du	Duct	At	Ac	Make-up torque, ft-lb		
2.375	0.7	1.890	3.350	2.875	0.659	2.563	180.0	250.0	18,400.0
2.375	0.8	1.890	3.350	2.875	0.873	2.563	180.0	250.0	23,800.0
2.375	1.0	1.890	3.350	2.875	1.084	2.563	180.0	250.0	29,200.0
2.375	1.3	1.890	3.350	2.875	1.429	2.563	180.0	250.0	36,600.0
2.375	1.6	1.890	3.350	2.875	1.767	2.563	180.0	250.0	36,600.0
2.875	1.9	1.890	3.350	2.875	2.729	2.563	180.0	250.0	36,600.0
2.875	1.0	2.380	3.350	2.875	1.061	2.875	210.0	300.0	28,200.0
2.875	1.2	2.380	3.350	2.875	1.319	2.875	210.0	300.0	36,200.0
2.875	1.4	2.380	3.350	2.875	1.575	2.875	210.0	300.0	44,600.0
2.875	1.8	2.380	3.350	2.875	2.077	2.875	210.0	300.0	49,800.0
2.875	2.3	2.380	3.350	2.875	2.649	2.875	210.0	300.0	49,800.0
2.875	2.9	2.380	3.350	2.875	3.284	2.875	210.0	300.0	49,800.0
3.500	1.5	2.890	3.350	2.875	1.509	3.125	280.0	350.0	41,800.0
3.500	1.8	2.890	3.350	2.875	1.928	3.125	280.0	350.0	53,600.0
3.500	2.0	2.890	3.350	2.875	2.343	3.125	280.0	350.0	65,800.0
3.500	2.7	2.890	3.350	2.875	3.157	3.125	280.0	350.0	66,400.0
3.500	3.4	2.890	3.350	2.875	3.951	3.125	280.0	350.0	66,400.0
3.500	4.3	2.890	3.350	2.875	4.821	3.125	280.0	350.0	66,400.0
4.500	2.4	3.870	3.350	2.875	2.629	3.500	380.0	450.0	73,600.0
4.500	2.9	3.870	3.350	2.875	3.302	3.500	380.0	450.0	94,400.0
4.500	3.4	3.870	3.350	2.875	3.968	3.500	380.0	450.0	95,600.0
4.500	4.6	3.870	3.350	2.875	5.275	3.500	380.0	450.0	95,600.0
4.500	5.9	3.870	3.350	2.875	6.801	3.500	380.0	450.0	95,600.0
5.500	3.1	4.310	3.350	2.875	3.559	3.500	470.0	550.0	90,000.0
5.500	3.7	4.310	3.350	2.875	4.386	3.500	470.0	550.0	109,000.0
5.500	4.3	4.310	3.350	2.875	5.368	3.500	470.0	550.0	109,000.0
5.500	5.7	4.310	3.350	2.875	7.299	3.500	470.0	550.0	109,000.0
5.500	7.3	4.310	3.350	2.875	9.184	3.500	470.0	550.0	109,000.0



TUBULAR FIBERGLASS RED BOX fiberglass tubing is an external upset, integral connection. It features conventional API 8RD EUE long form threads that allow direct tie-in to packers and wellhead equipment without changeovers. Laminate construction holds pressure without use of a sealing liner. Highly corrosion resistant, it is available in multiple pressure classifications up to 3,000 psi at 210°F. Tubing features reusable fiberglass connection that can be installed with controlled torque power tongs.

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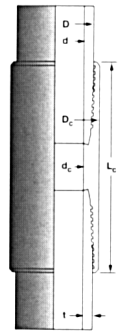
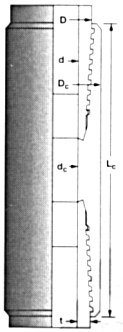


VAM Group VAM ACE (All Critical Environments) is a new type of connection, the heart of which is a reliable metal-to-metal configuration. This low angle-tapered interference seal is further energized by reverse angle torque shoulder and self energized by internal pressure. It was designed for use with CRA material. Copper plating process applied to coupling allows rejection rate during a stainless steel tubing completion to be as low as carbon steel. Design systematically offers greater than 100% efficiency compared to pipe body.



VAM Group NEW VAM is a non-upset connection with tapered metal-to-metal seal energized by reverse angle shoulder Buttress-type thread and coverage of vanishing threads allow maximum efficiency. Standard coupling is designed for greater than 100% efficiency. 6° mating chamfer reduces tolerances ID, and a long shoulder minimizes turbulence and energy losses inside tubing. T and C design allows easy repair. It can be delivered with 20° bevel on couplings.

VAM Group — NEW VAM

Sumitomo	J/K-55	L/N-80 SM-13Cr-80	C-90 SM-90SS	C/T-95 SM-13CrS-90	P-110 SM-13CrS-90	Q-125 SM-25Cr-125	SM-140G, SM-25Cr-140	SM-150G, SM-155G
Tubular Industries Scotland	J/K-55	L/N-80	C-90	C/T-95 ST-100	ST-110	Q-125	Grade 140	V150VY
VAM PTS	J/K-55	L/N-81	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
Vallourec Oil & Gas	L80 VH, L80 VC13, L/N-80		C95 VH/VHS, C90 VHS, C-90	C110 VHS, C95 VC13, C/T-95	P110 VT, P-110	Q-125	Grade 140	V-150

Type: Coupled	Seal: Metal-to-metal (RS optional)							J/K-55	L/N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
D	w	d	Dc	Dct 80	Dct 90	At	Ac	Make-up torque, 1,000 ft-lb							
2.375	4.6	1.995*	2.707	2.628	1.304	1.393		1.05-1.27	1.44-1.74	1.63-1.99	1.63-1.99	1.83-2.23	2.08-2.54	2.28-2.78	2.42-2.94
2.375	5.1	1.939	2.736	2.628	1.477	1.519		1.05-1.27	1.44-1.74	1.70-2.06	1.70-2.06	1.89-2.31	2.08-2.54	2.28-2.78	2.48-3.02
2.375	5.8	1.867	2.785	2.707	1.692	1.733		1.11-1.35	1.50-1.82	1.76-2.14	1.76-2.14	1.96-2.38	2.16-2.62	2.34-2.86	2.54-3.10
2.875	6.4	2.441*	3.240	3.159	1.812	1.927		1.57-1.91	2.16-2.62	2.54-3.10	2.54-3.10	2.87-3.49	3.19-3.89	3.52-4.30	3.78-4.20
2.875	7.8	2.323	3.337	3.274	2.254	2.424		1.70-2.06	2.28-2.78	2.61-3.17	2.61-3.17	3.00-3.66	3.33-4.05	3.65-4.45	3.91-4.77
2.875	8.6	2.259	3.364	3.274	2.484	2.570		1.89-2.31	2.54-3.10	2.93-3.57	2.93-3.57	3.39-4.13	3.78-4.62	4.11-5.01	4.43-5.41
2.875	9.8	2.151	3.435	3.337	2.858	2.948		2.16-2.62	2.93-3.57	3.39-4.13	3.39-4.13	3.85-4.69	4.30-5.24	4.69-5.73	5.08-6.20
3.500	7.7	3.068*	3.841	....	2.228	2.319		2.08-2.54	2.80-3.42	3.26-3.98	3.26-3.98	3.65-4.45	4.11-5.01	4.43-5.41	4.76-5.80
3.500	9.2	2.992	3.900	3.803	2.590	2.678		2.16-2.62	2.93-3.57	3.39-4.13	3.39-4.13	3.85-4.69	4.30-5.24	4.63-5.65	4.95-6.05
3.500	10.2	2.922	3.961	3.862	2.915	3.055		2.42-2.94	3.33-4.05	3.85-4.69	3.85-4.69	4.37-5.33	4.88-5.96	5.34-6.52	5.74-7.00
3.500	12.7	2.750	4.079	3.961	3.682	3.801		2.87-3.49	3.85-4.69	4.43-5.41	4.43-5.41	5.02-6.12	5.67-6.91	6.12-7.48	6.51-7.95
3.500	13.7	2.674	4.138	4.045	4.005	4.182		3.33-4.05	4.50-5.48	5.21-6.37	5.21-6.37	5.92-7.24	6.84-8.34	7.47-9.13	7.83-9.57
3.500	14.7	2.602	4.193	4.045	4.304	4.543		3.85-4.69	5.28-6.44	5.86-7.16	5.86-7.16	6.84-8.34	7.47-9.13	8.15-9.95	8.78-10.72
3.500	15.5	2.548	4.211	4.138	4.522	4.659		3.91-4.77	5.34-6.52	5.86-7.16	5.86-7.16	6.84-8.34	7.47-9.13	8.15-9.95	8.78-10.72
4.000	9.5	3.548*	4.348	....	2.680	2.788		2.61-3.17	3.59-4.37	4.17-5.09	4.17-5.09	4.69-5.73	5.21-6.37	5.67-6.91	6.12-7.48
4.000	10.9	3.476	4.407	4.327	3.077	3.195		2.74-3.34	3.71-4.53	4.30-5.24	4.30-5.24	4.88-5.96	5.40-6.60	5.86-7.16	6.32-7.72
4.000	13.2	3.340	4.516	4.366	3.805	3.954		3.13-3.81	4.30-5.24	4.95-6.05	4.95-6.05	5.60-6.84	6.32-7.72	6.84-8.34	7.47-9.13
4.000	14.8	3.240	4.606	4.469	4.322	4.602		3.91-4.77	5.40-6.60	6.25-7.63	6.25-7.63	7.17-8.75	8.15-9.95	8.78-10.72	9.50-11.50
4.000	16.5	3.140	4.656	....	4.823	4.960		4.04-4.92	5.48-6.68	6.38-7.80	6.38-7.80	7.17-8.75	8.15-9.95	9.15-11.15	9.85-11.85
4.500	10.5	4.052*	4.862	4.813	3.009	3.422		3.06-3.74	4.04-4.92	4.69-5.73	4.69-5.73	5.28-6.44	5.92-7.24	6.38-7.80	6.84-8.34
4.500	11.6	4.000*	4.862	4.813	3.338	3.422		3.13-3.81	4.17-5.09	4.81-5.89	4.81-5.89	5.40-6.60	6.06-7.40	6.51-7.95	7.17-8.75
4.500	12.6	3.958	4.892	4.813	3.600	3.649		3.19-3.89	4.30-5.24	4.95-6.05	4.95-6.05	5.54-6.76	6.19-7.55	6.51-7.95	7.17-8.75
4.500	13.5	3.920	4.961	4.813	3.836	4.182		3.33-4.05	4.43-5.41	5.08-6.20	5.08-6.20	5.73-7.01	6.32-7.72	7.17-8.75	7.47-9.13
4.500	15.1	3.826	5.010	4.892	4.407	4.566		3.78-4.62	5.21-6.37	5.99-7.31	5.99-7.31	6.84-8.34	7.47-9.13	8.15-9.95	8.80-10.74
4.500	17.0	3.740	5.106	....	4.918	5.334		4.56-5.56	6.25-7.63	7.17-8.75	7.17-8.75	8.15-9.95	9.15-11.15	10.1-12.3	11.1-13.5
4.500	18.9	3.640	5.146	....	5.498	5.650		4.69-5.73	6.38-7.80	7.47-9.13	7.47-9.13	8.46-10.34	9.50-11.50	10.45-12.65	11.1-13.5
4.500	21.5	3.500	5.280	....	6.283	6.746		5.54-6.76	7.83-9.57	9.15-11.15	9.15-11.15	10.85-13.05	11.7-14.3	12.45-15.05	13.05-15.85
4.500	23.7	3.380	5.333	....	6.932	7.189		5.67-6.91	8.15-9.95	9.5-11.5	9.5-11.5	10.85-13.05	12.1-14.7	12.45-15.05	13.05-15.85
5.000	13.0	4.494*	5.587	5.390	3.773	5.499		3.78-4.62	4.11-5.01	4.37-5.33	4.37-5.33	4.56-5.56	4.76-5.80	4.95-6.05	5.14-6.28
5.000	15.0	4.408	5.587	5.390	4.374	5.499		4.23-5.17	4.63-5.65	4.82-5.88	4.82-5.88	5.02-6.12	5.28-6.44	5.48-6.68	5.67-6.91
5.000	18.0	4.276	5.587	5.390	5.275	5.499		5.14-6.28	5.54-6.76	5.80-7.08	5.80-7.08	6.06-7.40	6.39-7.79	6.51-7.95	6.84-8.34
5.000	20.3	4.184	5.587	5.390	5.886	5.499		6.19-7.55	6.84-8.34	7.17-8.75	7.17-8.75	7.47-9.13	7.83-9.57	8.15-9.95	8.46-10.34
5.000	20.8	4.156	5.587	5.390	6.069	5.499		6.32-7.72	6.84-8.34	7.17-8.75	7.17-8.75	7.83-9.57	8.15-9.95	8.46-10.34	8.78-10.72
5.000	21.4	4.126	5.587	5.390	6.264	5.499		6.45-7.87	7.17-8.75	7.47-9.13	7.47-9.13	7.83-9.57	8.15-9.95	8.46-10.34	8.78-10.72
5.000	23.2	4.044	5.587	5.390	6.791	5.499		6.84-8.34	7.47-9.13	7.83-9.57	7.83-9.57	8.15-9.95	8.46-10.34	8.78-10.72	9.15-11.15
5.000	24.1	4.000	5.587	5.390	7.069	5.499		6.84-8.34	7.47-9.13	7.83-9.57	7.83-9.57	8.46-10.34	8.78-10.72	9.15-11.15	9.50-11.50
5.500	14.0	5.012*	6.075	5.890	4.029	5.977		3.55-4.41	4.26-5.28	4.56-5.56	4.56-5.56	4.82-5.88	5.06-6.22	5.35-6.51	5.50-6.80
5.500	15.5	4.950	6.075	5.890	4.514	5.977		4.23-5.17	4.63-5.65	4.88-5.96	4.88-5.96	5.14-6.28	5.40-6.60	5.67-6.91	5.86-7.16
5.500	17.0	4.892	6.075	5.890	4.962	5.977		4.56-5.56	4.95-6.05	5.22-6.35	5.22-6.35	5.48-6.68	5.74-7.00	5.99-7.31	6.19-7.55
5.500	20.0	4.778	6.075	5.890	5.828	5.977		5.34-6.52	5.86-7.16	6.12-7.48	6.12-7.48	6.45-7.87	6.84-8.34	7.17-8.75	7.17-8.75
5.500	23.0	4.670	6.075	5.890	6.630	5.977		6.39-7.79	7.17-8.75	7.47-9.13	7.47-9.13	7.83-9.57	8.46-10.34	8.78-10.72	9.15-11.15
5.500	26.0	4.548	6.075	5.890	7.513	5.977		6.84-8.34	7.47-9.13	8.15-9.95	8.15-9.95	8.46-10.34	8.78-10.72	9.50-11.50	9.85-11.85

* du value is less than the d value.

VAM Group — VAM ACE

Sumitomo	J/K-55	L/N-80	C-90 SM-90SS	C/T-95 SM-13CrS-95	P-110 SM-13CrS-110	Q-125 SM-25Cr-125 SM2535-130	SM-140G, SM2550-140	SM-150G, SM-155G
Tubular Industries Scotland	J/K-55	L/N-80	C-90	C/T-95 ST-95 ST-100	P-110 ST-110 ST-110 110V522	Q-125	XT-155	V-150
VAM PTS	J/K-55	L/N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
Vallourec Oil & Gas	L80 VH, L80 VC13, L/N-80		C90 VHS, C-90	C95 VH/VHS, C95 VC13, C/T-95	C110 VHS, P110 VT, P-110	Q-125	Grade 140	V150 VY V-150

Type: Coupled	Seal: Metal-to-metal (RS optional)							J/K-55	L/N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
D	w	d	Dc	Dct 80	Dct 90	At	Ac	Make-up torque, 1,000 ft-lb							
2.375	4.6	1.995*	2.697	2.618	2.657	1.304	1.420	0.85-1.03	0.91-1.11	0.98-1.18	0.98-1.18	1.05-1.27	1.11-1.35	1.24-1.50	1.31-1.59
2.375	5.1	1.939*	2.776	2.657	2.697	1.477	1.761	0.85-1.03	0.91-1.11	0.98-1.18	0.98-1.18	1.05-1.27	1.11-1.35	1.24-1.50	1.31-1.59
2.375	5.8	1.867	2.776	2.697	2.726	1.692	1.761	1.05-1.27	1.17-1.43	1.24-1.50	1.24-1.50	1.37-1.67	1.44-1.74	1.57-1.91	1.63-1.99
2.375	6.3	1.815	2.804	2.726	2.776	1.843	1.883	1.31-1.59	1.44-1.74	1.50-1.82	1.50-1.82	1.63-1.99	1.83-2.23	1.96-2.38	2.02-2.46
2.375	6.6	1.785	2.823	2.726	2.776	1.928	1.967	....	....	....	....	....	....	....	....
2.375	7.4	1.703	2.874	2.776	2.820	2.152	2.195	1.63-1.99	1.96-2.38	2.02-2.46	2.02-2.46	2.16-2.62	2.28-2.78	2.48-3.02	2.61-3.17
2.875	6.4	2.441*	3.230	3.142	3.179	1.812	1.891	1.31-1.59	1.63-1.99	1.76-2.14	1.76-2.14	1.96-2.38	2.08-2.54	2.22-2.70	2.28-2.78
2.875	7.8	2.323	3.327	3.230	3.264	2.254	2.392	1.63-1.99	1.83-2.23	2.02-2.46	2.02-2.46	2.22-2.70	2.34-2.86	2.48-3.02	2.61-3.17
2.875	8.6	2.259	3.355	3.264	3.327	2.484	2.539	1.96-2.38	2.22-2.70	2.42-2.94	2.42-2.94	2.61-3.17	2.80-3.42	3.00-3.66	3.13-3.81
2.875	9.4	2.195	3.397	3.295	3.354	2.708	2.762	2.16-2.62	2.54-3.10	2.80-3.42	2.80-3.42	3.00-3.66	3.26-3.98	3.45-4.21	3.59-4.37
2.875	9.8	2.151	3.426	3.327	3.362	2.858	2.916	2.28-2.78	2.80-3.42	3.06-3.74	3.06-3.74	3.26-3.98	3.59-4.37	3.78-4.62	3.91-4.77
2.875	10.5	2.091	3.463	3.354	3.405	3.058	3.119	....	....	....	....	....	....	....	....
2.875	10.7	2.065	3.480	3.354	3.425	3.143	3.209	2.61-3.17	3.13-3.81	3.45-4.21	3.45-4.21	3.78-4.62	4.11-5.01	4.37-5.33	4.56-5.56
2.875	11.5	1.995	3.528	3.405	3.449	3.366	3.474	2.93-3.57	3.33-4.05	3.59-4.37	3.59-4.37	3.97-4.85	4.23-5.17	4.56-5.56	4.88-5.96

Continued

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VAM ACE (continued)

Sumitomo	J/K-55	L/N-80	C-90 SM-90SS	C/T-95 SM-13Cr-95	P-110 SM-13Cr-110	Q-125 SM-25Cr-125 SM2535-130	SM-140G, SM2550-140	SM-150G, SM-155G
Tubular Industries Scotland	J/K-55	L/N-80	C-90	C/T-95 ST-95 ST-100	P-110 ST-110 ST-110 110V522	Q-125	XT-155	V-150
VAM PTS	J/K-55	L/N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
Vallourec Oil & Gas	J/K-55	L80 VH, L80 VC13, L/N-80	C90 VHS, C-90	C95 VH/VHS, C95 VC13, C/T-95	C110 VHS, P110 VT, P-110	Q-125	Grade 140	V150 VY V-150

Type: Coupled		Seal: Metal-to-metal (RS optional)										Make-up torque, 1,000 ft-lb			
D	w	d	Dc	Dct 80	Dct 90	At	Ac								
3.500	6.5	3.160*	3.830	3.693	3.724	1.778	2.266	1.38-1.66	1.57-1.91	1.70-2.06	1.70-2.06	1.89-2.31	2.02-2.46	2.08-2.54	2.23-2.75
3.500	7.7	3.068	3.830	3.748	3.793	2.228	2.266	1.57-1.91	1.76-2.14	1.89-2.31	1.89-2.31	2.08-2.54	2.22-2.70	2.34-2.86	2.48-3.02
3.500	9.2	2.992	3.890	3.799	3.852	2.590	2.629	2.22-2.70	2.54-3.10	2.74-3.34	2.74-3.34	2.93-3.57	3.13-3.81	3.26-3.98	3.39-4.13
3.500	10.2	2.922	3.950	3.852	3.890	2.915	2.999	2.80-3.42	3.13-3.81	3.33-4.05	3.33-4.05	3.59-4.37	3.85-4.69	4.04-4.92	4.23-5.17
3.500	12.7	2.750	4.069	3.951	4.000	3.682	3.748	3.91-4.77	4.43-5.41	4.76-5.80	4.76-5.80	5.08-6.20	5.54-6.76	6.19-7.55	6.51-7.95
3.500	13.7	2.674	4.138	4.000	4.069	4.005	4.193	4.23-5.17	4.88-5.96	5.21-6.37	5.21-6.37	5.86-7.16	6.19-7.55	6.51-7.95	6.84-8.34
3.500	14.3	2.640	4.204	4.012	4.069	4.147	4.628	....	....	....	....	....	....	....	....
3.500	14.7	2.602	4.200	4.035	4.128	4.304	4.600	4.88-5.96	5.54-6.76	6.19-7.55	6.19-7.55	6.84-8.34	7.17-8.75	7.47-9.13	7.83-9.57
3.500	15.5	2.548	4.200	4.069	4.128	4.522	4.600	5.21-6.37	5.86-7.16	6.51-7.95	6.51-7.95	7.17-8.75	7.83-9.57	8.15-9.95	8.46-10.34
3.500	16.7	2.480	4.250	4.094	4.157	4.791	4.932	5.86-7.16	6.51-7.95	7.17-8.75	7.17-8.75	7.83-9.57	8.46-10.34	9.15-11.15	9.85-11.85
4.000	8.2	3.620*	4.339	4.209	4.257	2.274	2.730	1.83-2.23	2.13-2.57	2.39-2.89	2.39-2.89	2.67-3.25	2.93-3.57	3.06-3.74	3.18-3.90
4.000	9.5	3.548*	4.339	4.257	4.317	2.680	2.730	2.28-2.78	2.61-3.17	2.93-3.57	2.93-3.57	3.26-3.98	3.59-4.37	3.78-4.62	3.91-4.77
4.000	10.9	3.476*	4.398	4.317	4.356	3.077	3.134	2.93-3.57	3.45-4.21	3.78-4.62	3.78-4.62	4.11-5.01	4.43-5.41	4.69-5.73	4.88-5.96
4.000	13.2	3.340	4.505	4.398	4.459	3.805	3.883	3.26-3.98	3.91-4.77	4.23-5.17	4.23-5.17	4.56-5.56	4.88-5.96	5.21-6.37	5.54-6.76
4.000	14.8	3.240	4.606	4.459	4.506	4.322	4.605	4.23-5.17	5.08-6.20	5.54-6.76	5.54-6.76	6.06-7.40	6.51-7.95	6.84-8.34	7.17-8.75
4.000	16.1	3.170	4.628	4.506	4.563	4.674	4.768	....	....	....	....	....	....	....	....
4.000	16.5	3.140	4.646	4.506	4.596	4.823	4.896	4.88-5.96	5.86-7.16	6.51-7.95	6.51-7.95	7.17-8.75	7.83-9.57	8.15-9.95	8.46-10.34
4.000	18.9	3.000	4.744	4.596	4.669	5.498	5.619	5.86-7.16	6.37-7.73	6.84-8.34	6.84-8.34	7.47-9.13	7.83-9.57	8.46-10.34	8.78-10.72
4.000	22.2	2.780	4.857	4.705	4.793	6.496	6.974	....	....	....	....	....	....	....	....
4.500	10.5	4.052*	4.862	4.734	4.793	3.009	3.382	2.48-3.02	3.00-3.66	3.26-3.98	3.26-3.98	3.59-4.37	3.91-4.77	4.11-5.01	4.23-5.17
4.500	11.6	4.000*	4.874	4.793	4.821	3.338	3.475	2.93-3.57	3.59-4.37	3.91-4.77	3.91-4.77	4.23-5.17	4.56-5.56	4.88-5.96	5.21-6.37
4.500	12.6	3.958	4.961	4.803	4.852	3.600	4.146	2.93-3.57	3.26-3.98	3.59-4.37	3.59-4.37	3.91-4.77	4.23-5.17	4.56-5.56	4.88-5.96
4.500	13.5	3.920	4.961	4.821	4.882	3.836	4.146	3.26-3.98	3.78-4.62	4.11-5.01	4.11-5.01	4.43-5.41	4.88-5.96	5.21-6.37	5.54-6.76
4.500	15.1	3.826	5.005	4.882	4.951	4.407	4.492	3.91-4.77	4.88-5.96	5.21-6.37	5.21-6.37	5.54-6.76	5.86-7.16	6.19-7.55	6.51-7.95
4.500	17.0	3.740	5.106	4.951	5.000	4.918	5.292	4.88-5.96	5.86-7.16	6.19-7.55	6.19-7.55	6.51-7.95	7.17-8.75	7.47-9.13	7.83-9.57
4.500	17.7	3.696	5.106	4.961	5.028	5.175	5.292	5.21-6.37	6.19-7.55	6.84-8.34	6.84-8.34	7.47-9.13	8.15-9.95	8.78-10.72	9.15-11.15
4.500	18.9	3.640	5.201	5.000	5.073	5.498	6.064	5.86-7.16	6.84-8.34	7.47-9.13	7.47-9.13	8.15-9.95	8.78-10.72	9.50-11.50	9.85-11.85
4.500	21.5	3.500	5.280	5.073	5.152	6.283	6.712	7.17-8.75	8.46-10.34	9.15-11.15	9.15-11.15	9.85-11.85	10.45-12.65	11.1-13.5	11.70-14.60
4.500	23.7	3.380	5.322	5.152	5.222	6.932	7.062	8.46-10.34	10.45-12.65	11.1-13.5	11.1-13.5	11.7-14.6	12.45-15.05	13.05-15.85	13.70-16.70
5.000	13.0	4.494	5.563	5.323	5.460	3.773	5.299	3.26-3.98	3.59-4.37	3.91-4.77	3.91-4.77	4.23-5.17	4.58-5.56	4.88-5.96	5.22-6.36
5.000	15.0	4.408	5.563	5.354	5.475	4.374	5.299	3.26-3.98	3.59-4.37	3.91-4.77	3.91-4.77	4.23-5.17	4.56-5.56	4.88-59.6	5.22-6.36
5.000	18.0	4.276	5.572	5.439	4.382	5.275	5.379	4.23-5.17	5.22-6.36	5.86-7.16	5.86-7.16	6.19-7.55	6.84-8.34	7.47-9.13	7.83-9.57
5.000	20.3	4.184	5.650	5.500	4.302	5.886	6.065	5.22-6.36	6.51-7.95	7.17-8.75	7.17-8.75	7.83-9.57	8.46-10.34	9.15-11.15	9.85-11.85
5.000	20.8	4.156	5.750	5.531	4.302	6.069	6.961	5.54-6.76	6.51-7.95	7.17-8.75	7.17-8.75	8.15-9.95	8.78-10.72	9.5-11.5	9.85-11.85
5.000	21.4	4.126	5.750	5.531	4.272	6.264	6.961	5.86-7.16	7.17-8.75	7.83-9.57	7.83-9.57	8.46-10.34	9.15-11.15	9.85-11.85	10.45-12.64
5.000	23.2	4.044	5.750	5.583	4.190	6.791	6.961	6.51-7.95	8.46-10.34	9.15-11.15	9.15-11.15	10.10-12.30	11.10-13.50	11.7-14.3	12.45-15.05
5.000	24.1	4.000	5.806	5.604	4.146	7.069	7.468	7.17-8.75	9.15-11.15	9.85-11.85	9.85-11.85	11.10-13.50	11.70-14.30	12.45-15.05	13.05-15.85
5.500	15.5	4.950	6.051	5.840	5.017	4.514	5.800	2.61-3.17	3.26-3.98	3.59-4.37	3.59-4.37	3.91-4.77	4.23-5.17	4.56-5.56	4.56-5.56
5.500	17.0	4.892	6.051	5.866	4.959	4.962	5.800	3.59-4.37	4.56-5.56	4.88-5.96	4.88-5.96	5.22-6.36	5.54-6.76	5.86-7.16	6.19-7.55
5.500	20.0	4.778	6.150	5.931	4.884	5.828	6.744	4.88-5.96	5.86-7.16	6.51-7.95	6.51-7.95	6.84-8.34	7.47-9.13	7.83-9.57	8.15-9.95
5.500	23.0	4.670	6.150	6.000	4.816	6.630	6.744	5.86-7.16	7.17-8.75	7.83-9.57	7.83-9.57	8.78-10.72	9.50-11.50	10.10-12.30	10.45-12.65
5.500	26.0	4.548	6.244	6.075	4.694	7.513	7.663	7.47-9.13	9.50-11.50	10.45-12.65	10.45-12.65	11.45-13.85	12.45-15.05	13.70-16.70	14.40-17.40
5.500	26.8	4.500	6.280	6.118	4.606	7.854	8.012	7.47-9.13	9.50-11.50	10.45-12.65	10.45-12.65	11.45-13.85	12.45-15.05	14.40-17.40	14.40-17.40
5.500	28.4	4.440	6.325	6.150	4.586	8.275	8.460	9.15-11.15	11.45-13.85	12.45-15.05	12.45-15.05	13.05-15.85	14.40-17.40	14.40-17.40	14.40-17.40
5.500	29.7	4.376	6.385	6.193	4.586	8.718	9.061	9.85-11.85	12.45-15.05	14.40-17.40	14.40-17.40	14.40-17.40	14.40-17.40	14.40-17.40	14.40-17.40

* du value is less than the d value.

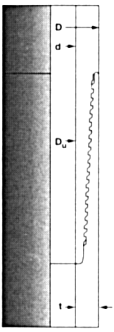
VAM Group

VAM FJL

Sumitomo	L/N-80 SM-80S	C-90 SM-80S	C/T-95	P-110	Q-125	SM-140G	SM-150G,
Tubular Industries Scotland	L/N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
VAM PTS	L/N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
Vallourec Oil & Gas	L80 VH L80VC13 L/N-80	C90 VHS C-90	C95 VH/VHS C95 VC13 C/T-95	P110 VT P-110	Q-125	Grade 140	V150 VY V-150

Type: Non-upset, flush		Seal: Int./ext. metal-to-metal					Make-up torque, 1,000 ft-lb						
D	w	du	Du	Duct	At	Ac							
2.375	4.6	1.933	....	....	1.304	0.586	0.52-0.64	0.59-0.71	0.59-0.71	0.62-0.76	0.65-0.79	0.68-0.84	0.74-0.92
2.375	5.1	1.878	....	....	1.477	0.760	0.59-0.71	0.62-0.76	0.62-0.76	0.72-0.86	0.75-0.91	0.78-0.96	0.85-1.03
2.375	5.8	1.811	....	....	1.692	0.936	0.65-0.79	0.72-0.86	0.72-0.86	0.78-0.96	0.85-1.03	0.88-1.08	1.01-1.23
2.375	6.3	1.764	....	....	1.843	1.015	0.72-0.88	0.78-0.96	0.78-0.96	0.85-1.03	0.94-1.16	0.97-1.19	1.17-1.43
2.375	7.4	1.654	....	....	2.152	1.183	0.78-0.96	0.85-1.03	0.85-1.03	0.91-1.11	1.05-1.27	1.17-1.43	1.30-1.58
2.875	6.4	2.382	....	....	1.812	0.887	0.78-0.96	0.85-1.03	0.85-1.03	0.88-1.08	0.97-1.19	1.05-1.27	1.11-1.35
2.875	7.8	2.276	....	....	2.254	1.172	0.91-1.11	1.05-1.27	1.05-1.27	1.17-1.43	1.3-1.58	1.37-1.67	1.50-1.84
2.875	8.6	2.213	....	....	2.486	1.378	1.17-1.43	1.30-1.58	1.30-1.58	1.50-1.84	1.63-1.99	1.69-2.07	1.83-2.23
2.875	9.8	2.106	....	....	2.858	1.573	1.37-1.67	1.50-1.84	1.50-1.84	1.63-1.99	1.83-2.23	1.89-2.31	2.08-2.54
2.875	10.7	2.020	....	....	3.143	2.038	1.50-1.84	1.63-1.99	1.63-1.99	1.76-2.14	1.96-2.38	2.08-2.54	2.34-2.86
3.500	7.7	3.016	....	....	2.228	1.059	0.97-1.19	1.05-1.27	1.05-1.27	1.17-1.43	1.30-1.58	1.37-1.67	1.50-1.84
3.500	9.2	2.941	....	....	2.590	1.420	1.11-1.35	1.17-1.43	1.17-1.43	1.23-1.51	1.37-1.67	1.43-1.75	1.57-1.91
3.500	10.2	2.858	....	....	2.915	1.598	1.23-1.51	1.30-1.58	1.30-1.58	1.43-1.75	1.50-1.84	1.57-1.91	1.69-2.07
3.500	12.7	2.673	....	....	3.682	2.390	1.57-1.91	1.76-2.14	1.76-2.14	1.96-2.38	2.16-2.62	2.28-2.78	2.47-3.03
3.500	13.7	2.594	....	....	4.005	2.713	1.69-2.07	1.89-2.31	1.89-2.31	2.16-2.62	2.34-2.86	2.47-3.03	2.74-3.34
3.500	14.7	2.524	....	....	4.304	2.931	1.83-2.23	2.02-2.46	2.02-2.46	2.28-2.78	2.54-3.10	2.67-3.27	2.86-3.50
3.500	15.5	2.472	....	....	4.522	3.075	1.96-2.38	2.16-2.62	2.16-2.62	2.47-3.03	2.74-3.34	2.86-3.50	3.12-3.82

Continued



VAM Group VAM FJL is a flush joint liner connection providing maximum running clearance and optimum strength for moderate depths. It offers true flush OD for maximum clearance, ID bored to greater than drift diameter and recess-free ID to reduce turbulence. Interference tapered thread has 15° reverse load flank for load transmission and jump-out prevention, and 45° stabbing flank for easy running and resistance to damage. It also provides resistance to cross-threading. It is designed for 65% efficiency under tension on medium wall tubing.

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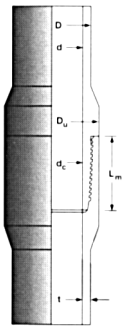
VAM FJL (continued)

Sumitomo						L/N-80 SM-80S	C-90 SM-80S	C/T-95	P-110	Q-125	SM-140G	SM-150G,
Tubular Industries Scotland						L/N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
VAM PTS						L/N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
Vallourec Oil & Gas						L80 VH L80VC13	C90 VHS	C95 VH/VHS C95 VC13	P110 VT			V150 VY
Type: Non-upset, flush		**Seal: Int./ext. metal-to-metal**				L/N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
D	**w**	**du**	**Du**	**Duct**	**At**	**Ac**	**Make-up torque, 1,000 ft-lb**					
4.000	9.5	3.480	....	....	2.680	1.288	1.17-1.43	1.37-1.67	1.37-1.67	1.57-1.91	1.69-2.07	1.83-2.23	2.02-2.46
4.000	10.9	3.398	....	....	3.077	1.685	1.30-1.58	1.43-1.75	1.43-1.75	1.63-1.99	1.83-2.23	1.96-2.38	2.16-2.62
4.000	11.3	3.374	....	....	3.337	1.837	1.37-1.67	1.50-1.84	1.50-1.84	1.69-2.07	1.89-2.31	2.02-2.46	2.21-2.71
4.000	13.2	3.260	....	....	3.895	2.093	2.02-2.46	2.28-2.78	2.28-2.78	2.48-3.02	2.68-3.26	2.74-3.34	3.12-3.82
4.000	14.8	3.165	....	....	4.322	2.610	2.34-2.86	2.54-3.10	2.54-3.10	2.74-3.34	2.94-3.58	3.06-3.74	3.33-4.05
4.000	16.5	3.063	....	....	4.823	3.111	2.60-3.18	2.80-3.41	2.80-3.41	3.00-3.66	3.26-3.98	3.39-4.13	3.59-4.37
4.500	11.6	3.917	....	....	3.338	1.533	1.96-2.38	2.16-2.62	2.16-2.62	2.42-2.94	2.68-3.26	2.94-3.58	3.19-3.89
4.500	12.6	3.878	....	....	3.600	1.796	2.02-2.46	2.22-2.70	2.22-2.70	2.48-3.02	2.74-3.34	3.00-3.66	3.26-3.98
4.500	13.5	3.843	....	....	3.836	2.031	2.09-2.55	2.28-2.78	2.28-2.78	2.54-3.10	2.80-3.41	3.06-3.74	3.33-4.05
4.500	15.1	3.756	....	....	4.407	2.602	2.28-2.78	2.48-3.02	2.48-3.02	2.74-3.34	3.00-3.66	3.19-3.89	3.52-4.30
4.500	17.0	3.673	....	....	4.918	3.112	2.48-3.02	2.74-3.34	2.74-3.34	3.00-3.66	3.26-3.98	3.52-4.30	3.85-4.69
4.500	18.9	3.575	....	....	5.498	3.577	2.68-3.26	2.94-3.58	2.94-3.58	3.33-4.05	3.59-4.37	3.85-4.69	4.23-5.17
4.500	21.5	3.453	....	....	6.283	4.086	3.00-3.66	3.26-3.98	3.26-3.98	3.65-4.45	3.91-4.77	4.30-5.24	4.56-5.56
4.500	23.7	3.335	....	....	6.932	4.514	3.00-3.66	3.52-4.30	3.52-4.30	3.91-4.77	4.23-5.17	4.56-5.56	4.89-5.97
5.000	13.0	4.417	....	....	3.773	2.079	1.63-1.99	1.89-2.31	1.89-2.31	2.16-2.62	2.42-2.94	2.61-3.17	2.80-3.42
5.000	15.0	4.331	....	....	4.374	2.407	1.76-2.14	2.02-2.46	2.02-2.46	2.28-2.78	2.48-3.02	2.68-3.26	2.94-3.58
5.000	18.0	4.209	....	....	5.275	3.205	2.87-3.49	3.00-3.66	3.00-3.66	3.26-3.98	3.59-4.37	3.85-4.69	4.17-5.09
5.000	20.3	4.118	....	....	5.886	3.818	3.19-3.89	3.39-4.13	3.39-4.13	3.59-4.37	3.78-4.62	4.04-4.92	4.37-5.33
5.000	20.8	4.091	....	....	6.069	3.999	3.45-4.21	3.59-4.37	3.59-4.37	3.71-4.53	3.85-4.69	4.11-5.01	4.22-5.41
5.000	21.4	4.079	....	....	6.264	4.083	3.52-4.30	3.78-4.62	3.78-4.62	3.91-4.77	4.04-4.92	4.23-5.17	4.50-5.48
5.000	23.2	3.996	....	....	6.791	4.574	3.59-4.37	3.91-4.77	3.91-4.77	4.23-5.17	4.63-5.65	4.76-5.80	4.89-5.97
5.000	24.1	3.957	....	....	7.069	4.574	3.65-4.45	4.04-4.92	4.04-4.92	4.43-5.41	4.76-5.80	4.89-5.97	5.02-6.12
5.500	15.5	4.874	....	....	4.514	2.488	2.42-2.94	2.74-3.34	2.74-3.34	3.13-3.81	3.45-4.21	3.78-4.62	4.04-4.92
5.500	17.0	4.823	....	....	4.962	2.736	2.54-3.10	2.87-3.49	2.87-3.49	3.19-3.89	3.59-4.37	3.85-4.69	3.17-5.09
5.500	20.0	4.709	....	....	5.828	3.421	3.19-3.89	3.65-4.45	3.65-4.45	4.04-4.92	4.50-5.48	4.89-5.97	5.34-6.52
5.500	23.0	4.602	....	....	6.630	4.221	3.85-4.69	3.97-4.85	3.97-4.85	4.37-5.33	4.76-5.80	5.14-6.28	5.54-6.76
5.500	26.0	4.500	....	....	7.513	5.031	3.81-4.65	4.43-5.41	4.43-5.41	4.69-5.73	5.08-6.20	5.48-6.68	5.86-7.16
5.500	28.4	4.390	....	....	8.275	5.391	4.43-5.41	5.08-6.20	5.08-6.20	5.28-6.44	5.40-6.60	5.80-7.08	6.19-7.55

VAM Group

VAM ACE XS & XS-C

Sumitomo						J/K-55	L/N-80 SM-80S	C-90 SM-90S	C/T-95 SM-95S	P-110 SM-95S	Q-125	SM-140G,	SM-150G,
Tubular Industries Scotland						J/K-55	L/N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
VAM PTS						J/K-55	L/N-81	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
Vallourec Oil & Gas													
Type: Upset, integral		**Seal: Metal-to-metal (RS optional)**				J/K-55	L/N-80	C-90	C/T-95	P-110	Q-125	Grade 140	V-150
D	**w**	**du**	**Du**	**Duct**	**At**	**Ac**	**Make-up torque, 1,000 ft-lb**						
2.375	4.7	1.933	2.697	....	1.304	1.420	1.24-1.50	1.37-1.67	1.50-1.82	1.50-1.82	1.57-1.91	1.70-2.06	1.83-2.23	1.96-2.38
2.375	5.3	1.904	2.776	....	1.477	1.614	1.24-1.50	1.37-1.67	1.50-1.82	1.50-1.82	1.57-1.91	1.70-2.06	1.83-2.23	1.96-2.38
2.375	6.0	1.832	2.776	....	1.692	1.759	1.57-1.91	1.76-2.14	1.89-2.31	1.89-2.31	2.02-2.46	2.16-2.62	2.34-2.86	2.48-3.02
2.375	6.4	1.780	2.804	....	1.843	1.882	1.96-2.38	2.16-2.62	2.28-2.78	2.28-2.78	2.48-3.02	2.75-2.54	2.93-3.57	3.06-3.74
2.375	7.5	1.668	2.874	....	2.152	2.195	2.48-3.02	2.93-3.57	3.06-3.74	3.06-3.74	3.26-3.93	3.45-4.21	3.72-4.52	3.91-4.77
2.875	6.5	2.386	3.230	....	1.812	1.891	1.96-2.38	2.42-2.94	2.67-3.25	2.67-3.25	2.93-3.57	3.13-3.81	3.33-4.05	3.45-4.21
2.875	7.9	2.288	3.327	....	2.254	2.392	2.42-2.94	2.75-3.33	3.06-3.74	3.06-3.74	3.33-4.05	3.50-4.30	3.72-4.52	3.91-4.77
2.875	8.7	2.224	3.355	....	2.484	2.539	2.93-3.57	3.33-4.05	3.65-4.45	3.65-4.45	3.91-4.77	4.16-5.10	4.48-5.50	4.70-5.70
2.875	9.5	2.160	3.397	....	2.708	2.762	3.26-3.98	3.78-4.62	4.16-5.10	4.16-5.10	4.48-5.50	4.88-5.96	5.13-6.29	5.35-6.51
2.875	10.4	2.116	3.426	....	2.858	2.917	3.45-4.21	4.23-5.17	4.56-5.56	4.56-5.56	4.88-5.42	5.35-6.51	5.64-6.94	5.86-7.16
2.875	11.0	2.030	3.480	....	3.143	3.209	3.91-4.77	4.70-5.70	5.20-6.36	5.20-6.36	5.64-6.94	6.19-7.55	6.51-7.95	6.84-8.34
3.500	7.7	3.002	3.830	....	2.228	2.271	2.34-2.86	2.61-3.17	2.85-3.51	2.85-3.51	3.13-3.81	3.33-4.05	3.50-4.30	3.72-4.52
3.500	9.3	2.926	3.890	....	2.590	2.634	3.33-4.05	3.78-4.62	4.11-5.01	4.11-5.01	4.37-5.33	4.70-5.70	4.88-5.96	5.06-6.22
3.500	10.3	2.856	3.950	....	2.915	3.004	4.23-5.17	4.70-5.70	5.00-6.14	5.00-6.14	5.35-6.51	5.71-7.01	6.07-7.37	6.29-7.73
3.500	13.0	2.684	4.069	....	3.682	3.753	5.86-7.16	6.51-7.95	7.17-8.75	7.17-8.75	7.83-9.57	8.46-10.34	9.15-11.15	9.85-11.85
3.500	14.5	2.608	4.138	....	4.005	4.198	6.29-7.73	7.17-8.75	7.83-9.57	7.83-9.57	8.46-10.34	9.15-11.15	9.85-11.85	10.45-12.65
3.500	14.7	2.536	4.200	....	4.304	4.604	7.17-8.75	8.15-9.95	9.15-11.15	9.15-11.15	9.85-11.85	10.85-13.05	11.10-13.50	11.70-14.60
3.500	15.5	2.482	4.200	....	4.522	4.604	7.83-9.57	8.78-10.72	9.85-11.85	9.85-11.85	10.85-13.05	11.70-14.60	12.10-14.70	12.70-15.50
4.000	9.5	3.476	4.339	....	2.680	2.730	3.45-4.21	3.91-4.77	4.37-5.33	4.37-5.33	4.88-5.96	5.35-6.51	5.64-6.94	5.86-7.16
4.000	11.0	3.406	4.398	....	3.077	3.314	4.37-5.33	5.20-6.36	5.64-6.94	5.64-6.94	6.15-7.45	6.51-7.95	6.84-8.34	7.47-9.13
4.000	13.4	3.274	4.505	....	3.805	3.883	4.88-5.96	5.86-7.16	6.29-7.73	6.29-7.73	6.84-8.34	7.47-9.13	7.83-9.57	8.46-10.34
4.000	15.5	3.174	4.606	....	4.322	4.605	6.51-7.95	7.83-9.57	8.46-10.34	9.4	9.15-11.15	9.85-11.85	10.45-12.65	10.85-13.05
4.000	17.5	3.074	4.646	....	4.823	4.897	7.47-9.13	8.78-10.72	9.85-11.85	9.85-11.85	10.85-13.05	11.70-14.60	12.45-15.05	12.70-15.50
4.500	10.5	3.980	4.862	....	3.009	3.381	3.72-4.52	4.48-5.50	4.88-5.96	4.88-5.96	5.35-6.51	5.86-7.16	6.15-7.45	6.29-7.73
4.500	11.6	3.929	4.874	....	3.338	3.475	4.37-5.33	5.35-6.51	5.86-7.16	5.86-7.16	6.29-7.73	6.84-8.34	7.47-9.13	7.83-9.57
4.500	12.8	3.892	4.961	....	3.600	4.070	4.37-5.33	4.88-5.96	5.35-6.51	5.35-6.51	5.86-7.16	6.29-7.73	6.84-8.34	7.47-9.13
4.500	13.5	3.854	4.961	....	3.836	4.146	4.88-5.96	5.64-6.94	6.15-7.45	6.15-7.45	6.51-7.95	7.17-8.75	7.83-9.57	8.46-10.34
4.500	15.5	3.760	5.005	....	4.407	4.492	6.19-7.55	7.17-8.75	7.83-9.57	7.83-9.57	8.46-10.34	8.78-10.72	9.15-11.15	9.85-11.85
4.500	17.5	3.674	5.106	....	4.918	5.292	7.17-8.75	8.78-10.72	9.15-11.15	9.15-11.15	9.85-11.85	10.85-13.05	11.10-13.50	11.70-14.60
4.500	18.5	3.630	5.106	....	5.175	5.292	7.83-9.57	9.15-11.15	10.45-12.65	10.45-12.65	11.10-13.50	12.45-15.05	13.05-15.85	13.70-16.70
4.500	19.2	3.574	5.201	....	5.498	5.937	8.78-10.72	10.45-12.65	11.45-13.85	11.45-13.85	12.45-15.05	13.05-15.85	14.40-17.40	15.00-18.30
4.500	21.5	3.434	5.280	....	6.283	6.712	10.85-13.05	12.70-15.50	13.70-16.70	13.70-16.70	14.60-17.94	15.60-19.10	16.60-20.30	17.55-21.45
4.500	23.7	3.314	5.322	....	6.932	7.062	12.70-15.50	15.60-19.10	16.60-20.30	16.60-20.30	17.55-21.45	18.50-22.70	19.55-23.85	20.85-25.45



VAM Group VAM ACE XS-C, an upset integral version of XS, includes features of VAM ACE XS and is coatable. Elastomer ring located at internal shoulder enables reliable and easy internal plastic coating for use with highly corrosive fluids.

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SECTION 20

WASH OVER PIPE

	Page
HYDRIL FJ-WP Washpipe Properties	1-6
Misc. Washpipe Threads properties	7

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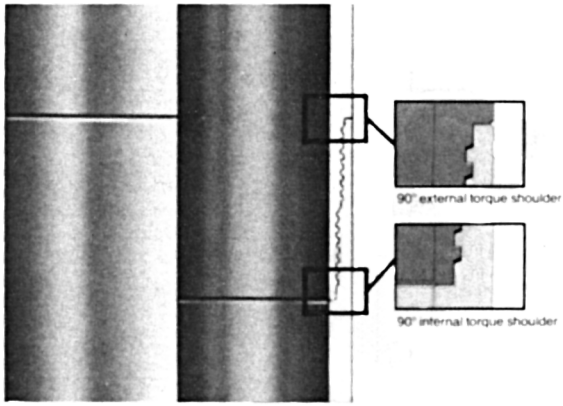
HYDRIL FJ - WP



High torque strength flush-joint washpipe develops twice the torque load strength of ordinary joints for continued make and break usage.

2-Step, non-tapered thread profile

- No thread interference to cause galling
- Fast make-up
- Stable, 2-thread flank stabbing

Rugged 90° torque shoulders

- Provided by two square shoulders
- Torque shoulders make-up together and act as a unit
- Develops twice the torque strength of regular connections

WASHPIPE APPLICATIONS

- Resistance to handling damage
- Shoulders like a tool joint for the repeated use requirements of washover operations

Geothermal Liner Applications

- Good compression strength
- Slotted and perforated liner applications
- Some size available with standard Hydril thread protectors.

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WASHPIPE DIMENSIONAL / MECHANICAL PROPERTIES
(HYDRIL "FJ-WP" CONNECTION / N-80 PIPE MATERIAL)

Size O.D.	Nom. Weight	Actual Weight	I.D.	Wall Thk.	Drift Diam.	Joint Tensile Strength	Joint Torque Yield	Conn. Make Up Torque	Wash Over Size	
									Recom.OD of Fish	Max.OD of Fish
in	lb/ft	lb/ft	in	in	in	lb	ft.lb	ft.lb	in	in
mm	**kg/m**	**kg/m**	**mm**	**mm**	**mm**	**daN**	**N.m**	**N.m**	**mm**	**mm**
3 1/2	9.2	8.81	2.992	0.254	2.867	107,600	3,100	770	2 11/16	2 13/16
88.9	**13.69**	**13.10**	**76.00**	**6.45**	**72.82**	**47,800**	**4,200**	**1,040**	**68.3**	**71.4**
3 3/4	9.5	9.35	3.250	0.250	3.125	107700	3500	870	3	3 1/8
95.3	**14.14**	**13.91**	**82.55**	**6.35**	**79.38**	**47,900**	**4,700**	**1,170**	**76.2**	**79.4**
4	11.6	11.34	3.428	0.286	3.303	139,000	4,700	1,170	3 1/8	3 1/4
101.6	**17.26**	**16.88**	**87.07**	**7.26**	**83.90**	**61,800**	**6,300**	**1,580**	**79.4**	**82.6**
	14.0	12.93	3.340	0.330	3.215	156,900	5,400	1,350	3 1/16	3 3/16
	20.83	**19.25**	**84.84**	**8.38**	**81.66**	**69,700**	**7,300**	**1,830**	**77.8**	**81.0**
	15.7	14.69	3.240	0.380	3.115	161,700	6,500	1,620	2 15/16	3 1/16
	23.36	**21.86**	**82.30**	**9.65**	**79.12**	**71,900**	**8,800**	**2,190**	**74.6**	**77.8**
4 3/8	13.6	13.58	3.749	0.313	3.624	165,300	6,000	1,500	3 7/16	3 9/16
111.1	**20.21**	**20.21**	**95.22**	**7.95**	**92.05**	**73,500**	**8,100**	**2,030**	**87.3**	**90.5**
4 1/2	13.5	13.04	3.920	0.290	3.795	155,000	5,700	1,420	3 5/8	3 3/4
114.3	**20.09**	**19.40**	**99.57**	**7.37**	**96.39**	**68,900**	**7,700**	**1,920**	**92.1**	**95.3**
	15.1	14.98	3.826	0.337	3.701	181,800	7,100	1,770	3 9/16	3 11/16
	22.47	**22.30**	**97.18**	**8.56**	**94.01**	**80,800**	**9,600**	**2,390**	**90.5**	**93.7**
4 3/4	16.0	15.75	4.082	0.334	3.957	192,900	7,900	1,970	3 13/16	3 15/16
120.7	**23.81**	**23.44**	**103.68**	**8.48**	**100.51**	**85,800**	**10,700**	**2,670**	**96.8**	**100.0**
	17.5	17.52	4.000	0.375	3.875	192,900	9,100	2,270	3 3/4	3 7/8
	26.07	**26.08**	**101.60**	**9.53**	**98.43**	**85,800**	**12,300**	**3,070**	**95.3**	**98.4**
5	15.0	14.87	4.408	0.296	4.283	179,800	7,400	1,850	4 1/8	4 1/4
127.0	**22.32**	**22.13**	**111.96**	**7.52**	**108.79**	**79,900**	**10,000**	**2,500**	**104.8**	**108.0**
	18.0	17.93	4.276	0.362	4.151	218,600	9,800	2,450	4	4 1/8
	26.79	**26.69**	**108.61**	**9.19**	**105.44**	**97,200**	**13,200**	**3,320**	**101.6**	**104.8**
	23.0	23.09	4.044	0.478	3.919	278,300	13,500	3,370	3 3/4	3 7/8
	34.23	**34.35**	**102.72**	**12.14**	**99.54**	**123,700**	**18,300**	**4,560**	**95.3**	**98.4**

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WASHPIPE DIMENSIONAL / MECHANICAL PROPERTIES
(HYDRIL "FJ-WP" CONNECTION / N-80 PIPE MATERIAL)

Size O.D.	Nom. Weight	Actual Weight	I.D.	Wall Thk.	Drift Diam.	Joint Tensile Strength	Joint Torque Yield	Conn. Make Up Torque	Wash Over Size	
									Recom.OD of Fish	Max.OD of Fish
in **mm**	lb/ft **kg/m**	lb/ft **kg/m**	in **mm**	in **mm**	in **mm**	lb **daN**	ft.lb **N.m**	ft.lb **N.m**	in **mm**	in **mm**
5 3/8	19.5	18.93	4.669	0.353	4.544	229,900	11,000	2,750	4 3/8	4 1/2
136.5	**29.02**	**28.18**	**118.59**	**8.97**	**115.42**	**102,200**	**14,900**	**3,720**	**111.1**	**114.3**
5 1/2	17.0	16.87	4.892	0.304	4.767	203,600	9,400	2,350	4 5/8	4 3/4
139.7	**25.30**	**25.11**	**124.26**	**7.72**	**121.08**	**90,500**	**12,700**	**3,180**	**117.5**	**120.7**
	20.0	19.81	4.778	0.361	4.653	241,900	11,900	2,970	4 1/2	4 5/8
	29.76	**29.49**	**121.36**	**9.17**	**118.19**	**107,600**	**16,100**	**4,020**	**114.3**	**117.5**
	23.0	22.54	4.670	0.415	4.545	269,700	14,100	3,520	4 3/8	4 1/2
	34.23	**33.54**	**118.62**	**10.54**	**115.44**	**119,900**	**19,100**	**4,770**	**111.1**	**114.3**
	26.0	25.54	4.548	0.476	4.423	305,200	16,600	4,150	4 1/4	4 3/8
	38.69	**38.01**	**115.52**	**12.09**	**112.34**	**135,700**	**22,500**	**5,620**	**108.0**	**111.1**
5 3/4	18.0	18.12	5.126	0.312	5.001	215,900	10,500	2,620	4 7/8	5
146.1	**26.79**	**26.97**	**130.20**	**7.92**	**127.03**	**96,000**	**14,200**	**3,550**	**123.8**	**127.0**
	22.5	21.79	4.990	0.380	4.865	264,800	13,900	3,470	4 11/16	4 13/16
	33.48	**32.43**	**126.75**	**9.65**	**123.57**	**117,700**	**18,800**	**4,700**	**119.1**	**122.2**
6	20.0	19.64	5.352	0.324	5.227	231,900	12,500	3,120	5 1/16	5 3/16
152.4	**29.76**	**29.23**	**135.94**	**8.23**	**132.77**	**103,100**	**16,900**	**4,230**	**128.6**	**131.8**
	23.0	22.81	5.240	0.380	5.115	273,200	15,500	3,870	4 15/16	5 1/16
	34.23	**33.94**	**133.10**	**9.65**	**129.92**	**121,500**	**21,000**	**5,240**	**125.4**	**128.6**
6 1/4	20.0	19.79	5.626	0.312	5.501	235,600	12,900	3,220	5 3/8	5 1/2
158.8	**29.76**	**29.45**	**142.90**	**7.92**	**139.73**	**104,800**	**17,400**	**4,360**	**136.5**	**139.7**
6 3/8	24.0	24.03	5.625	0.375	5.500	285,500	17,200	4,300	5 3/8	5 1/2
161.9	**35.72**	**35.76**	**142.88**	**9.53**	**139.70**	**126,900**	**23,300**	**5,830**	**136.5**	**139.7**
	28.0	27.77	5.499	0.438	5.374	329,600	20,900	5,220	5 3/16	5 5/16
	41.67	**41.33**	**139.67**	**11.13**	**136.50**	**146,600**	**28,300**	**7,070**	**131.8**	**134.9**

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WASHPIPE DIMENSIONAL / MECHANICAL PROPERTIES
(HYDRIL "FJ-WP" CONNECTION / N-80 PIPE MATERIAL)

Size O.D.	Nom. Weight	Actual Weight	I.D.	Wall Thk.	Drift Diam.	Joint Tensile Strength	Joint Torque Yield	Conn. Make Up Torque	Wash Over Size	
									Recom.OD of Fish	Max.OD of Fish
in **mm**	lb/ft **kg/m**	lb/ft **kg/m**	in **mm**	in **mm**	in **mm**	lb **daN**	ft.lb **N.m**	ft.lb **N.m**	in **mm**	in **mm**
6 5/8	24.0	23.58	5.921	0.352	5.796	279,700	17,200	4,300	5 5/8	5 3/4
168.3	**35.72**	**35.10**	**150.39**	**8.94**	**147.22**	**124,400**	**23,300**	**5,830**	**142.9**	**146.1**
	28.0	27.65	5.791	0.417	5.666	279,700	20,500	5,120	5 1/2	5 5/8
	41.67	**41.14**	**147.09**	**10.59**	**143.92**	**124,400**	**27,700**	**6,940**	**139.7**	**142.9**
6 3/4	35.0	34.60	5.710	0.520	5.585	331,600	25,300	6,320	5 7/16	5 9/16
171.5	**52.09**	**51.49**	**145.03**	**13.21**	**141.86**	**147,500**	**34,300**	**8,560**	**138.1**	**141.3**
7	23.0	22.63	6.366	0.317	6.241	239,700	15,500	3,870	6 1/16	6 3/16
177.8	**34.23**	**33.67**	**161.70**	**8.05**	**158.52**	**106,600**	**21,000**	**5,240**	**154.0**	**157.2**
	26.0	25.66	6.276	0.362	6.151	301,000	18,800	4,700	6	6 1/8
	38.69	**38.19**	**159.41**	**9.19**	**156.24**	**133,800**	**25,400**	**6,370**	**152.4**	**155.6**
	29.0	28.72	6.184	0.408	6.059	335,900	21,900	5,470	5 7/8	6
	43.16	**42.75**	**157.07**	**10.36**	**153.90**	**149,400**	**29,600**	**7,410**	**149.2**	**152.4**
	32.0	31.68	6.094	0.453	5.969	335,900	25,100	6,270	5 13/16	5 15/16
	47.62	**47.14**	**154.79**	**11.51**	**151.61**	**149,400**	**34,000**	**8,500**	**147.6**	**150.8**
7 3/8	29.0	28.04	6.625	0.375	6.500	329,000	22,000	5,500	6 3/8	6 1/2
187.3	**43.16**	**41.72**	**168.28**	**9.53**	**165.10**	**146,300**	**29,800**	**7,450**	**161.9**	**165.1**
	32.5	32.45	6.499	0.438	6.374	329,000	27,000	6,750	6 3/16	6 5/16
	48.37	**48.29**	**165.07**	**11.13**	**161.90**	**146,300**	**36,600**	**9,150**	**157.2**	**160.3**
7 1/2	28.0	27.99	6.765	0.368	6.640	333,800	22,200	5,550	6 1/2	6 5/8
190.5	**41.67**	**41.66**	**171.83**	**9.33**	**168.66**	**148,400**	**30,000**	**7,520**	**165.1**	**168.3**
7 5/8	26.4	25.56	6.969	0.328	6.844	270,200	19,400	4,850	6 11/16	6 13/16
193.7	**39.29**	**38.04**	**177.01**	**8.33**	**173.84**	**120,100**	**26,300**	**6,570**	**169.9**	**173.0**
	29.7	29.04	6.875	0.375	6.750	340,400	23,600	5,900	6 5/8	6 3/4
	44.20	**43.21**	**174.63**	**9.53**	**171.45**	**151,400**	**31,900**	**7,990**	**168.3**	**171.5**
	33.7	33.04	6.765	0.430	6.640	389,500	28,300	7,070	6 1/2	6 5/8
	50.15	**49.17**	**171.83**	**10.92**	**168.66**	**173,200**	**38,300**	**9,580**	**165.1**	**168.3**

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WASHPIPE DIMENSIONAL / MECHANICAL PROPERTIES
(HYDRIL "FJ-WP" CONNECTION / N-80 PIPE MATERIAL)

Size O.D.	Nom. Weight	Actual Weight	I.D.	Wall Thk.	Drift Diam.	Joint Tensile Strength	Joint Torque Yield	Conn. Make Up Torque	Wash Over Size	
									Recom.OD of Fish	Max.OD of Fish
in **mm**	lb/ft **kg/m**	lb/ft **kg/m**	in **mm**	in **mm**	in **mm**	lb **daN**	ft.lb **N.m**	ft.lb **N.m**	in **mm**	in **mm**
7 5/8	39.0	38.05	6.625	0.500	6.500	451,600	34,300	8,570	6 3/8	6 1/2
193.7	**58.04**	**56.62**	**168.28**	**12.70**	**165.10**	**200,800**	**46,500**	**11,610**	**161.9**	**165.1**
	45.3	44.67	6.435	0.595	6.310	451,700	39,900	9,970	6 1/8	6 1/4
	67.41	**66.48**	**163.45**	**15.11**	**160.27**	**200,900**	**54,000**	**13,510**	**155.6**	**158.8**
8	31.0	30.54	7.250	0.375	7.125	358,500	26,000	6,500	7	7 1/8
203.2	**46.13**	**45.45**	**184.15**	**9.53**	**180.98**	**159,400**	**35,200**	**8,810**	**177.8**	**181.0**
8 1/8	32.0	30.65	7.385	0.370	7.260	358,400	26,300	6,570	7 1/8	7 1/4
206.4	**47.62**	**45.60**	**187.58**	**9.40**	**184.40**	**159,400**	**35,600**	**8,900**	**181.0**	**184.2**
	35.5	34.56	7.285	0.420	7.160	406,100	31,300	7,820	7	7 1/8
	52.83	**51.43**	**185.04**	**10.67**	**181.86**	**180,600**	**42,400**	**10,600**	**177.8**	**181.0**
	39.5	38.43	7.185	0.470	7.060	455,400	36,200	9,050	6 7/8	7
	58.78	**57.18**	**182.50**	**11.94**	**179.32**	**202,500**	**49,000**	**12,270**	**174.6**	**177.8**
8 3/8	35.5	32.00	7.626	0.375	7.501	344,500	28,400	7,100	7 5/16	7 7/16
212.7	**52.83**	**47.62**	**193.70**	**9.51**	**190.53**	**153,200**	**38,500**	**9,620**	**185.7**	**188.9**
8 5/8	36.0	35.14	7.825	0.400	7.700	418,300	33,500	8,370	7 1/2	7 5/8
219.1	**53.57**	**52.29**	**198.76**	**10.16**	**195.58**	**186,000**	**45,400**	**11,340**	**190.5**	**193.7**
	40.0	39.29	7.725	0.450	7.600	463,700	38,700	9,670	7 3/8	7 9/16
	59.53	**58.47**	**196.22**	**11.43**	**193.04**	**206,200**	**52,400**	**13,110**	**187.3**	**192.1**
	44.0	43.39	7.625	0.500	7.500	513,100	44,000	11,000	7 5/16	7 7/16
	65.48	**64.57**	**193.68**	**12.70**	**190.50**	**228,200**	**59,600**	**14,910**	**185.7**	**188.9**
9	40.0	38.92	8.150	0.425	8.025	462,700	39,200	9,800	7 13/16	7 15/16
228.6	**59.53**	**57.92**	**207.01**	**10.80**	**203.84**	**205,800**	**53,100**	**13,280**	**198.4**	**201.6**
9 3/16	31.0	30.83	8.536	0.326	8.411	282,000	26,300	6,570	8 1/8	8 3/8
233.4	**46.13**	**45.88**	**216.81**	**8.27**	**213.64**	**125,400**	**35,600**	**8,900**	**206.4**	**212.7**
9 5/16	38.0	37.05	8.535	0.389	8.410	438,400	37,200	9,300	8 1/8	8 3/8
236.5	**56.55**	**55.14**	**216.79**	**9.87**	**213.61**	**195,000**	**50,400**	**12,600**	**206.4**	**212.7**

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WASHPIPE DIMENSIONAL / MECHANICAL PROPERTIES
(HYDRIL "FJ-WP" CONNECTION / N-80 PIPE MATERIAL)

Size O.D.	Nom. Weight	Actual Weight	I.D.	Wall Thk.	Drift Diam.	Joint Tensile Strength	Joint Torque Yield	Conn. Make Up Torque	Wash Over Size	
									Recom.OD of Fish	Max.OD of Fish
in **mm**	lb/ft **kg/m**	lb/ft **kg/m**	in **mm**	in **mm**	in **mm**	lb **daN**	ft.lb **N.m**	ft.lb **N.m**	in **mm**	in **mm**
9 1/2	47.0	46.47	8.535	0.483	8.410	454,800	48,500	12,120	8 1/8	8 3/8
241.3	**69.94**	**69.15**	**216.79**	**12.26**	**213.61**	**202,300**	**65,700**	**16,430**	**206.4**	**212.7**
9 5/8	40.0	38.94	8.835	0.395	8.679	456,300	40,700	10,170	8 3/8	8 5/8
244.5	**59.53**	**57.95**	**224.41**	**10.03**	**220.44**	**202,900**	**55,100**	**13,780**	**212.7**	**219.1**
	43.5	42.70	8.755	0.435	8.599	501,500	46,400	11,600	8 1/4	8 1/2
	64.74	**63.54**	**222.38**	**11.05**	**218.41**	**223,000**	**62,900**	**15,720**	**209.6**	**215.9**
	47.0	46.14	8.681	0.472	8.525	541,900	51,400	12,850	8 3/16	8 7/16
	69.94	**68.66**	**220.50**	**11.99**	**216.53**	**241,000**	**69,600**	**17,420**	**208.0**	**214.3**
	53.5	52.85	8.535	0.545	8.379	541,900	60,000	15,000	8 1/16	8 5/16
	79.62	**78.65**	**216.79**	**13.84**	**212.82**	**241,000**	**81,300**	**20,330**	**204.8**	**211.1**
10 3/4	45.5	44.22	9.950	0.400	9.794	504,200	50,600	12,650	9 7/16	9 11/16
273.1	**67.71**	**65.80**	**252.73**	**10.16**	**248.76**	**224,200**	**68,600**	**17,150**	**239.7**	**246.1**
	51.0	49.50	9.850	0.450	9.694	574,400	59,800	14,950	9 3/8	9 5/8
	75.90	**73.67**	**250.19**	**11.43**	**246.22**	**255,500**	**81,000**	**20,260**	**238.1**	**244.5**
	55.5	54.21	9.760	0.495	9.604	639,100	68,600	17,150	9 1/4	9 1/2
	82.59	**80.68**	**247.90**	**12.57**	**243.94**	**284,200**	**93,000**	**23,250**	**235.0**	**241.3**
11 3/4	54.0	52.57	10.880	0.435	10.724	616,100	69,300	17,320	10 1/8	10 5/8
298.5	**80.36**	**78.23**	**276.35**	**11.05**	**272.38**	**274,000**	**93,900**	**23,480**	**257.2**	**269.9**
	60.0	58.81	10.772	0.489	10.616	690,000	80,900	20,220	10	10 1/2
	89.29	**87.52**	**273.61**	**12.42**	**269.64**	**306,900**	**109,600**	**27,410**	**254.0**	**266.7**
13 3/8	72.0	70.60	12.347	0.514	12.191	826,200	112,100	28,020	11 1/2	12
339.7	**107.15**	**105.07**	**313.61**	**13.06**	**309.65**	**367,500**	**151,900**	**37,990**	**292.1**	**304.8**
16	84.0	81.97	15.010	0.495	14.823	970,100	123,500	30,870	14 1/8	14 5/8
406.4	**125.01**	**121.98**	**381.25**	**12.57**	**376.49**	**431,500**	**167,400**	**41,850**	**358.8**	**371.5**
	109.0	107.50	14.688	0.656	14.501	1,210,800	184,300	46,070	13 13/16	14 5/16
	162.21	**159.98**	**373.08**	**16.66**	**368.31**	**538,500**	**249,800**	**62,460**	**350.8**	**363.5**

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WASHPIPE DIMENSIONAL / MECHANICAL PROPERTIES
(MISCELLANEOUS SIZES AND THREADS / N-80 PIPE MATERIAL)

Size O.D.	Nom. Weight	Actual Weight	Thread Type & Description	I.D.	Wall Thk.	Drift Diam.	Joint Tensile Strength	Joint Torque Yield	Conn. Make Up Torque
in	lb/ft	lb/ft		in	in	in	lb	ft.lb	ft.lb
mm	**kg/m**	**kg/m**		**mm**	**mm**	**mm**	**daN**	**N.m**	**N.m**
1.315	2.17	2.17	Homco Single Step FJ	0.957	0.179	0.832	17,000	250	120
33.4	**3.23**	**3.23**	8 TPI Tapered ACME	**24.31**	**4.55**	**21.13**	**7,500**	**330**	**160**
1.900	4.19	3.93	FJ-WP Double Step	1.462	0.219	1.337	43,800	900	220
48.3	**6.24**	**5.85**	8 TPI / 7.5 deg. Thread	**37.13**	**5.56**	**33.96**	**19,400**	**1,220**	**290**
2 1/16	3.25	3.17	FJ-WP Double Step	1.751	0.156	1.626	36,100	680	170
52.4	**4.84**	**4.72**	8 TPI / 7.5 deg. Thread	**44.48**	**3.96**	**41.30**	**16,000**	**920**	**230**
2 1/16	4.50	4.41	FJ-WP Double Step	1.613	0.225	1.488	49,200	950	230
52.4	**6.70**	**6.56**	8 TPI / 7.5 deg. Thread	**40.97**	**5.71**	**37.80**	**21,800**	**1,280**	**310**
2 1/4	4.14	4.13	Homco Single Step FJ	1.875	0.188	1.75	36,400	1,170	580
57.2	**6.16**	**6.15**	8 TPI / 7.5 deg. Thread	**47.63**	**4.76**	**44.45**	**16,100**	**1,580**	**790**
2 1/4	4.12	4.13	FJ-WP Double Step	1.875	0.188	1.75	47,500	850	210
57.2	**6.13**	**6.15**	8 TPI / 7.5 deg. Thread	**47.63**	**4.76**	**44.45**	**21,100**	**1,150**	**280**
2.343	4.03	4.03	Homco Single Step FJ	1.995	0.174	1.87	36,800	1,190	590
59.5	**6.00**	**6.00**	8 TPI / 7.5 deg. Thread	**50.67**	**4.42**	**47.50**	**16,300**	**1,600**	**800**
2 7/8	6.16	6.16	FJ-WP Double Step	2.441	0.217	2.316	73,800	1,760	440
73.0	**9.17**	**9.17**	8 TPI / 7.5 deg. Thread	**62.00**	**5.51**	**58.83**	**32,800**	**2,380**	**590**
3 1/2	9.2	8.81	Argus FJ-AT	2.992	0.254	2.867	123,000	2,500	1,500
88.9	**13.69**	**13.10**	Single Step	**76.00**	**6.45**	**72.82**	**54,700**	**3,300**	**2,030**
3 3/4	9.30	9.35	Homco Single Step FJ	3.250	0.250	3.125	80,500	4,180	2,090
95.3	**13.84**	**13.91**	6 TPI Stub ACME	**82.55**	**6.35**	**79.38**	**35,800**	**5,660**	**2,830**
3 13/16	11.70	11.71	FJ-WP Double Step	3.186	0.313	3.061	137,400	4,980	1,240
96.8	**17.41**	**17.42**	8 TPI / 7.5 deg. Thread	**80.92**	**7.96**	**77.75**	**61,100**	**6,750**	**1,680**
4	9.50	9.11	Homco Single Step FJ	3.548	0.226	3.423	77,100	4,220	2,110
101.6	**14.14**	**13.56**	6 TPI / 7.5 degree Thrd	**90.12**	**5.74**	**86.94**	**34,200**	**5,720**	**2,860**
4	11.00	10.46	FJ-WP Double Step	3.476	0.262	3.351	122,500	4,230	1,050
101.6	**16.37**	**15.57**	8 TPI / 7.5 deg. Thread	**88.29**	**6.65**	**85.12**	**54,400**	**5,730**	**1,420**

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SECTION 21

GENERAL INFORMATION

	Page
Decimal Equivalents Of An Inch In Inches And Millimeters	1-2
CommonUnits Symbols	3
Common Oilfield Conversion Factors	4-5
Detailed Conversion Factors	7-18
Weights, Measures & Temperatures	19-21
Fluid Density & Pressure	22-23
Tubing Movement Formulas	24
Gas Flow Through Choke	25
Class "A" Cement Slurry	26
Capacity Of Vertical Cylindrical Tanks	27
Capacity Of Bolted Steed Tanks	28-30
Formulas For Calculating Capacities Of Tanks, Pits & Pipe Lines	31-35
Physical Properties Of Calcium Chloride Solutions	36
Weights Of Salt Water Solutions	37
Drilling Mud & Oil Conversion Table	38-39
Mud Weight Comparison Tables	40-41
Oil, Water & Mud Specific Gravity Weight & Pressure Table	42-43
Pump Output For Duplex & Triplex Pumps	44-45
Formulas For:	
Areas Of Circles—Dia.—Area Tables	46-47
Normal Formation Pressure	48
Calculating Velocity & Horsepower	49
Calculating Volumes & Height Between Pipe & Hole Etc.	50-52
Effect Of Depth & Mud Weight On Hydrostatic Pressure	53-56
PSI Per Barrel	57-58

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Pressure Drop Across A Single Nozzle 59
Brinell Hardness & Testing 60-61
A.P.I. Flanges 62-65
Manual Tong Torque Ft. Pounds 66
Dimensional Data On Line Pipe 67-68
Dimensional Data & Test Pressure On Line Pipe 69
Recommendations For Tools Versus Casing & Hole Size 70
Formulas Used In Well Control And Drilling Operations 71-86
Mechanical Spliced Sling Capacity 87
H^2S Sour Gas Safety Information 88-90
Dimensions & Weights Of Steel Tubular Flanges & Fittings 91-110

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DECIMAL EQUIVALENTS OF FRACTIONS OF AN INCH IN INCHES AND MILLIMETERS

Fraction	Dec. Equiv.	Millimeters	Fraction	Dec. Equiv.	Millimeters
1/64	.015625	**0.397**	33/64	.515625	**13.097**
1/32	.03125	**0.794**	17/32	.53125	**13.494**
3/64	.046875	**1.191**	35/64	.546875	**13.891**
1/16	.0625	**1.588**	9/16	.5625	**14.288**
5/64	.078125	**1.984**	37/64	.578125	**14.684**
3/32	.09375	**2.381**	19/32	.59375	**15.081**
7/64	.109375	**2.778**	39/64	.609375	**15.478**
1/8	.1250	**3.175**	5/8	.6250	**15.875**
9/64	.140625	**3.572**	41/64	.640625	**16.272**
5/32	.15625	**3.969**	21/32	.65625	**16.669**
11/64	.171875	**4.366**	43/64	.671875	**17.066**
3/16	.1875	**4.763**	11/16	.6875	**17.463**
13/64	.203125	**5.159**	45/64	.703125	**17.859**
7/32	.21875	**5.556**	23/32	.71875	**18.256**
15/64	.234375	**5.953**	47/64	.734375	**18.653**
1/4	.2500	**6.350**	3/4	.7500	**19.050**
17/64	.265625	**6.747**	49/64	.765625	**19.447**
9/32	.28125	**7.144**	25/32	.78125	**19.844**
19/64	.296875	**7.541**	51/64	.796875	**20.241**
5/16	.3125	**7.938**	13/16	.8125	**20.638**
21/64	.328125	**8.334**	53/64	.828125	**21.034**
11/32	.34375	**8.731**	27/32	.84375	**21.431**
23/64	.359375	**9.128**	55/64	.859375	**21.828**
3/8	.3750	**9.525**	7/8	.8750	**22.225**
25/64	.390625	**9.922**	57/64	.890625	**22.622**
13/32	.40625	**10.319**	29/32	.90625	**23.019**
27/64	.421875	**10.716**	59/64	.921875	**23.416**
7/16	.4375	**11.113**	15/16	.9375	**23.813**
29/64	.453125	**11.509**	61/64	.953125	**24.209**
15/32	.46875	**11.906**	31/32	.96875	**24.606**
31/64	.484375	**12.303**	63/64	.984375	**25.003**
1/2	.5000	**12.700**	1	1.000	**25.400**

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DECIMAL EQUIVALENTS OF INCHES IN FEET AND MILLIMETERS

Inches	Dec. Equiv.	Millimeters
1	.0833	**25.4**
2	.1667	**50.8**
3	.2500	**76.2**
4	.3333	**101.6**
5	.4167	**127.0**
6	.5000	**152.4**
7	.5833	**177.8**
8	.6667	**203.2**
9	.7500	**228.6**
10	.8333	**254.0**
11	.9167	**279.4**
12	1.000	**304.8**

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COMMON UNITS SYMBOLS

SI (metric) Units		Imperial Units	
Unit	**Symbol**	**Unit**	**Symbol**
kilometer	km	mile	mile
meters	m	feet	ft
centimeter	cm	inch	in
millimeter	mm	square inches	in^2
square meters	m^2	cubic inches	in^3
cubic meters	m^3	cubic feet	ft^3
cubic centimeters	cm^3 (cc)	barrel (oil)	bbl
Liter	L	U.S. gallons	USgal
milliliter	ml	Imperial gallons	imp.gal
gram	gm	Ounce	oz
kilogram	kg	pound	lb
kilogram-force	kgf	specific gravity	S.G.
newton	N	pound force	lbf
deca-newton	daN	pounds/in^2	psi
kilo-newton	kN	1000 pounds/in^2	ksi
ton (metric)	t	bar	bar
pascal	Pa	British Thermal U.	B.T.U.
Kilo-Pascal	kPa	horse power	hp
Mega-Pascal	MPa	Second	sec
watt	W	minute	min
kilo-watt	kW	hour	hr
joule	J	calorie	cal

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COMMON OILFIELD CONVERSION FACTORS

SI CONVERSION				IMPERIAL CONVERSION			
LENGTH / DEPTH / DIAMETER							
1 m	=	3.28084	ft	1 ft	=	0.3048	m
1 m	=	100	cm	1 ft	=	12	in
1 m	=	1000	mm	1 yard	=	3	ft
1 mm	=	0.0394	in	1 in	=	25.4	mm
AREA							
1 m^2	=	10.7639	ft^2	1 ft^2	=	0.0929	m^2
1 m^2	=	1000000	mm^2	1 ft^2	=	144	in^2
1 m^2	=	1550.003	in^2	1 in^2	=	6.452×10^{-4}	m^2
VOLUME / CAPACITY / DISPLACEMENT							
1 m^3	=	35.3147	ft^3	1 ft^3	=	0.02832	m^3
1 m^3	=	1000	L	1 ft^3	=	1728	in^3
1 m^3	=	264.172	USgal	1 USgal	=	231	in^3
1 m^3	=	6.29	bbl	1 bbl	=	158.98	L
1 cc	=	1	ml	1 bbl	=	42	USgal
1 L	=	61.0237	in^3	1 in^3	=	0.016387	L
1 L	=	0.26417	USgal	1 USgal	=	3.7854	L
LINEAR VOLUME / CAPACITY / DISPLACEMENT							
1 m^3/m	=	10.7639	ft^3/ft	1 ft^3/ft	=	0.09290	m^3/m
1 m^3/m	=	1.9172	bbl/ft	1 bbl/ft	=	0.52160	m^3/m
1 L/m	=	0.08052	USgal/ft	1 USgal/ft	=	12.41933	L/m
MASS							
1 kg	=	2.20462	lb	1 lb	=	0.45359	kg
1 t	=	1000	kg	1 ton short	=	2000	lb
1 t	=	1	ton long	1 ton long	=	2240	lb
LINEAR MASS							
1 kg/m	=	0.67197	lb/ft	1 lb/ft	=	1.48817	kg/m

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COMMON OILFIELD CONVERSION FACTORS

SI CONVERSION				IMPERIAL CONVERSION			
FORCE / WEIGHT							
1 kgf	=	9.80665	N	1 lbf	=	1	lb
1 daN	=	2.2481	lbf	1 lbf	=	0.44482	daN
TORQUE							
1 N.m	=	0.73756	ft.lb	1 ft.lb	=	1.35582	N.m.
1 N.m	=	0.75215	kgf.m	1 ft.lb	=	12	in.lb
DENSITY / MUD WEIGTH							
1 kg/m^3	=	0.008345	lb/USgal	1 lb/USgal	=	119.83	kg/m^3
1 kg/m^3	=	0.062428	lb/ft3	1 lb/ft3	=	16.0185	kg/m3
1 S.G.	=	1000	kg/m^3	1 S.G.	=	8.3454	lb/USgal
PRESSURE							
1 MPa	=	1000	kPa	1 ksi	=	1000	psi
1 kPa	=	0.14504	psi	1 psi	=	6.8948	kPa
1 bar	=	100	kPa	1 bar	=	14.504	psi
PRESSURE GRADIENT							
1 kPa/m	=	0.04421	psi/ft	1 psi/ft	=	22.621	kPa/m
VISCOSITY							
1 Pa.s	=	1000	centipoise	1 lb.s/ft^2	=	47.8803	Pa.s
ENERGY							
1 J	=	0.0009478	B.T.U.	1 B.T.U.	=	1055.06	J
1 J	=	0.238846	cal	1 cal	=	4.1868	J
POWER							
1 kW	=	1.341	hp	1 hp	=	0.7457	Kw
TEMPERATURE							
deg C	=	(deg F-32)/ 1.8		deg F	=	(deg C x 1.8)+32	

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CONVERSION FACTORS

Multiply	By	To Obtain
Acre	43,560.	Square Feet
Acre	4,047.	Square Meters
Acre	160.	Square Rods
Acre	5,645.4	Square Varas (Texas)
Acre	.4047	Hectares
Acre Foot	7,758.	Barrels
Atmospheres	76.0	Cms. of Mercury
Atmospheres	760.0	Millimetres of Mercury
Atmospheres	29.92	Inches of Mercury
Atmospheres	33.90	Feet of Water
Atmospheres	1.0333	Kgs./Sq. Cm.
Atmospheres	14.70	Lbs./Sq. Inch
Atmospheres	1.058	Tons/Sq. Ft.
Barrel	5.6146	Cubic Feet
Barrel	.15897	Cubic Metres
Barrels-Oil	42.	Gallons - Oil
Barrel of Water	.1588	Metric Ton
Barrel (36° A.P.I.)	.1342	Metric Ton
Barrel per Hour	.0936	Cu. Ft. per Minute
Barrel per Hour	.700	Gallon per Minute
Barrel per Hour	2.695	Cu. In. per Second
Barrel per Day	.02917	Gallon per Minute
Bars	.9869	Atmospheres
Bars	2089.	Lbs./Sq./Foot
Bars	14.50	Lbs./Sq.- Inch
British Thermal Units	0.2520	Kilogram - Calories
British Thermal Units	.2928	Watt Hour
British Thermal Units	777.5	Foot-Lbs.
British Thermal Units	.0003927	Horsepower - hours
British Thermal Units	107.5	Kilogram - metres
British Thermal Units	.0002928	Kolowatt - hours
B.T.U./min.	12.96	Foot-lbs./sec.
B.T.U./min.	.02356	Horsepower
B.T.U./min.	.01757	Kilowatts
B.T.U./min.	17.57	Watts

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CONVERSION FACTORS

Multiply	By	To Obtain
Centares (Centaires)	1.	Square Metres
Centigrams	.01	Grams
Centilitres	.01	Litres
Centimetres	.3937	Inches
Centimetres	.01	Metres
Centimetres	10.	Millimetres
Centimetres of Mercury	.01316	Atmospheres
Centimetres of Mercury	.4461	Feet of Water
Centimetres of Mercury	136.0	Kgs./Sq. Metre
Centimetres of Mercury	27.85	Lbs./Sq. Ft.
Centimetres of Mercury	.1934	Lbs./Sq. Inch
Centimetres/Second	1.969	Feet/Min.
Centimetres/Second	.03281	Feet/Sec.
Centimetres/Second	.036	Kilometres/Hrs.
Centimetres/Second	.6	Metres/Min.
Centimetres/Second	.02237	Miles/Hrs.
Centimetres/Second	.0003728	Miles/Min.
Centimetres/Second/Second	.03281	Feet/Sec./Sec.
Chain	66.00	Feet
Chain	4.00	Rods
Cubic Centimetres	.00003531	Cubic Feet
Cubic Centimetres	.06102	Cubic Inches
Cubic Centimetres	.0000010	Cubic Metres
Cubic Centimetres	.000001308	Cubic Yards
Cubic Centimetres	.0002642	Gallons
Cubic Centimetres	.001	Litres
Cubic Centimetres	.002113	Pints (Liq.)
Cubic Centimetres	.001057	Quarts (liq.)
Cubic Feet	.1781	Barrels
Cubic Feet	28320.	Cubic Cms.
Cubic Feet	1728.	Cubic Inches
Cubic Feet	.02832	Cubic Metres
Cubic Feet	.03704	Cubic Yards
Cubic Feet	7.48052	Gallons
Cubic Feet	28.32	Litres
Cubic Feet	59.84	Pints (Liq.)
Cubic Feet	29.92	Quarts (Liq.)

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CONVERSION FACTORS

Multiply	By	To Obtain
Cubic Feet/Minute	472.0	Cubic Cm./Sec.
Cubic Feet/Minute	.1247	Gallons/Sec.
Cubic Feet/Minute	.47200	Litres/Sec.
Cubic Feet/Minute	62.43	Lbs. of Water/Min.
Cubic Feet/Minute	10.686	Barrels per Hour
Cubic Feet/Minute	28.8000	Cubic In. per Sec.
Cubic Feet/Second	.646317	Million Gals./Day
Cubic Feet/Second	448.831	Gallons/Minute
Cubic Inches	16.39	Cubic Centimetres
Cubic Inches	.0005787	Cubic Feet
Cubic Inches	.00001639	Cubic Metres
Cubic Inches	.00002143	Cubic Yards
Cubic Inches	.004329	Gallons
Cubic Inches	.01639	Litres
Cubic Inches	.03463	Pints (Liq.)
Cubic Inches	.01732	Quarts (Liq.)
Cubic Metres	6.2905	Barrels
Cubic Metres	1,000,000.	Cubic Centimetres
Cubic Metres	35.31	Cubic Feet
Cubic Metres	61,023.	Cubic Inches
Cubic Metres	1.308	Cubic Yards
Cubic Metres	264.2	Gallons
Cubic Metres	1,000.	Litres
Cubic Metres	2,113.	Pints (Liq.)
Cubic Metres	1,057.	Quarts (Liq.)
Cubic Yards	4.8089	Barrels
Cubic Yards	764,600.	Cubic Centimetres
Cubic Yards	27.	Cubic Feet
Cubic Yards	46,656.	Cubic Inches
Cubic Yards	0.7646	Cubic Metres
Cubic Yards	202.0	Gallons
Cubic Yards	764.6	Litres
Cubic Yards	1,616.	Pints (Liq.)
Cubic Yards	807.9	Quarts (Liq.)

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CONVERSION FACTORS

Multiply	By	To Obtain
Cubic Yards/Min.	.45	Cubic Feet/Sec.
Cubic Yards/Min.	3.367	Gallon/Sec.
Cubic Yards/Min.	12.74	Litres/Sec.
Decigrams	.1	Grams
Decilitres	.1	Litres
Decimetres	.1	Metres
Degrees (angle)	60.	Minutes
Degrees (angle)	.01745	Radians
Degrees (angle)	3600.	Seconds
Degrees/Sec.	.01745	Radians/Sec.
Degrees/Sec.	.1667	Revolutions/Min.
Degrees/Sec.	.002778	Revolutions/Sec.
Dekagrams	10.	Gram
Dekalitres	10.	Litres
Dekametres	10.	Metres
Drams	27.34375	Grains
Drams	.0625	Ounces
Drams	1.771845	Grams
Fathoms	6.	Feet
Feet	30.48	Centimetres
Feet	12.	Inches
Feet	.3048	Metres
Feet	.36	Varas (Texas)
Feet	1/3	Yards
Feet of Water	.0295	Atmospheres
Feet of Water	.8826	Inches of Mercury
Feet of Water	.03048	Kgs./Sq. Cm.
Feet of Water	62.43	Lbs./Sq. Ft.
Feet of Water	.4335	Lbs./Sq. In.
Feet/Min.	.508	Centimetres/Sec.
Feet/Min.	.01667	Feet/Sec.
Feet/Min.	.01829	Kilometres/Hr.
Feet/Min.	.3048	Metres/Min.
Feet/Min.	.01136	Miles/Hr.
Feet/Sec.	.68182	Miles per hour
Feet/Sec./Sec.	30.48	Cms./Sec./Sec.
Feet/Sec./Sec.	.3048	Metres/Sec./Sec.

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CONVERSION FACTORS

Multiply	By	To Obtain
Foot-pounds	.001286	British Thermal Units
Foot-pounds	.0000005050	Horsepower-hrs.
Foot-pounds	.0003241	Kilogram-calories
Foot-pounds	.1383	Kilogram-metres
Foot-pounds	.0000003766	Kilowatts-hrs.
Foot-pounds/min.	.001286	British Thermal Units/min
Foot-pounds/min.	.01667	Foot-pounds/sec.
Foot-pounds/min.	.00003030	Horsepower
Foot-pounds/min.	.0003241	Kg.-calories/min.
Foot-pounds/min.	.00002260	Kilowatts
Foot-pounds/sec.	.07717	B.T. Units/min.
Foot-pounds/sec.	.001818	Horsepower
Foot-pounds/sec.	.01945	Kg.-calories/min.
Foot-pounds/sec.	.001356	Kilowatts
Gallons (U.S.)	.02381	Barrel
Gallons (U.S.)	.83267	Gallons (Imperial)
Gallons	3,785.	Cubic Centimetres
Gallons	.1337	Cubic Feet
Gallons	231.	Cubic Inches
Gallons	.003785	Cubic Metres
Gallons	.00495	Cubic Yards
Gallons	3.785	Litres
Gallons	8.	Pints (Liq.)
Gallons	4.	Quarts (Liq.)
Gallons (Imperial)	1.20095	Gallons (U.S.)
Gallons (Imperial)	277.419	Cubic Inches
Gallons Water	8.3453	Pounds of Water
Gallons/min.	1.429	Barrels per hour
Gallons/min.	.1337	Cu. Ft. per minute
Gallons/min.	34.286	Barrels per day
Gallons/min.	.06308	Litres/sec.
Gallons/min.	8.0208	Cu. Ft./hr.
Gallons/min.	.002228	Cu. Ft./sec.
Gallons of water/min.	6.0086	Tons Water/24 hrs.

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CONVERSION FACTORS

Multiply	By	To Obtain
Grains (troy)	1.	Grains (avoir.)
Grains (troy)	.06480	Grams
Grains (troy)	.04167	Pennyweights (troy)
Grains (troy)	.0020833	Ounces (troy)
Grains/U.S. gal.	17.118	Parts/million
Grains/U.S. gal.	142.86	Lbs./million gal.
Grains/Imperial gal.	14.286	Parts/million
Grams	980.7	Dynes
Grams	15.43	Grains
Grams	.001	Kilograms
Grams	1,000.	Milligrams
Grams	.03527	Ounces (Avoir.)
Grams	.03215	Ounces (troy)
Grams	.002205	Pounds
Grams/cm	.0056	Pounds/inch
Grams/cu.cm	62.43	Pounds/cubic foot
Grams/cu.cm	.03613	Pounds/cubic inch
Grams/litre	58.417	Grains/gal.
Grams/litre	8.345	Pounds/1000 gals.
Grams/litre	.062427	Pounds/cubic foot
Grams/litre	1,000.	Parts/million
Hectare	2.471	Acres
Hectare	.010	Square Kilometre
Hectograms	100.	Grams
Hectolitres	100.	Litres
Hectowatts	100.	Watts
Horsepower	42.44	B.T. U/min.
Horsepower	33,000.	Foot-lbs./min.
Horsepower	550.	Foot-lbs./sec.
Horsepower	1.014	Horsepower (Metric)
Horsepower	10.70	Kg.-calories/min.
Horsepower	.7457	Kilowatts
Horsepower	745.7	Watts
Horsepower (boiler)	33,479.	B.T.U./hr.
Horsepower (boiler)	9.803	Kilowatts

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CONVERSION FACTORS

Multiply	By	To Obtain
Horsepower - hours	2,547.	British Thermal Units
Horsepower - hours	1,980,000.	Foot-lbs.
Horsepower - hours	641.7	Kilogram-calorie
Horsepower - hours	273,700.	Kilogram-metres
Horsepower - hours	.7457	Kilogram-hours
Inches	2.540	Centimetres
Inches of Mercury	.03342	Atmospheres
Inches of Mercury	1.133	Feet of Water
Inches of Mercury	.03453	Kgs./Sq. Cm.
Inches of Mercury	70.73	Lbs./Sq. Ft.
Inches of Mercury	.4912	Lbs./Sq. In.
Inches of Water	.002458	Atmospheres
Inches of Water	.07355	Inches of Mercury
Inches of Water	.002540	Kgs./Sq. Cm.
Inches of Water	.5781	Ounces/Sq. Inch
Inches of Water	5.202	Lbs./Sq. Ft.
Inches of Water	.03613	Lbs./Sq. Inch
Kilograms	980,665.	Dynes
Kilograms	2.205	Lbs.
Kilograms	.001102	Tons (short)
Kilograms	1,000.	Grams
Kilograms-metre	7.233	Ft-lbs.
Kilograms/metre	.6720	Lbs./Ft.
Kilograms/sq. cm.	.9678	Atmospheres
Kilograms/sq. cm.	32.81	Feet of Water
Kilograms/sq. cm.	28.96	Inches of Mercury
Kilograms/sq. cm.	2,048.	Lbs./Sq. Foot
Kilograms/sq. cm.	14.22	Lbs./Sq. Inch
Kgs/sq. millimetre	1,000,000.	Kgs./Sq Metre
Kilolitres	1,000.	Litres
Kilometres	100,000.	Centimetres
Kilometres	3,281.	Feet
Kilometres	1,000.	Metres
Kilometres	.6214	Miles
Kilometres	.5396	Miles (nautical)
Kilometres	1,094.	Yards

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CONVERSION FACTORS

Multiply	By	To Obtain
Kilometres/hr.	27.78	Centimetres/sec.
Kilometres/hr.	54.68	Feet/min.
Kilometres/hr.	.9113	Feet/sec.
Kilometres/hr.	.5396	Knots
Kilometres/hr.	16.67	Metres/min.
Kilometres/hr.	.6214	Miles/hr.
Kilonewton K*N	.225	Pounds Force
Kms./hr./sec.	27.78	Cms./sec./sec.
Kms./hr./sec.	.9113	Ft./sec./sec.
Kms./hr./sec.	.2778	Metres/sec./sec.
Kilowatts	56.92	British Thermal Units/min.
Kilowatts	44,250.	Foot-lbs./min.
Kilowatts	737.6	Foot-lbs./sec.
Kilowatts	1.341	Horsepower
Kilowatts	14.34	Kg.-calories/min.
Kilowatts	1,000.	Watts
Killowatt-hours	3.415.	British Thermal Units
Killowatt-hours	2,655,000.	Foot-lbs.
Killowatt-hours	1.341	Horsepower-hrs.
Killowatt-hours	860.5	Kilogram-calories
Killowatt-hours	367,100.	Kilogram-metres
Knot	1.	Nautical Miles per Hour
Knot	1.151	Statute Mile per Hour
Link (Surveyorís)	7.92	Inches
Litres	1,000.	Cubic Centimetres
Litres	.03531	Cubic Feet
Litres	61.02	Cubic Inches
Litres	.001	Cubic Metres
Litres	.001308	Cubic Yards
Litres	.2642	Gallons Pints (Liq.)
Litres	2.113	Pints (Liq.)
Litres	1.057	Quarts (Liq.)
Litres/min.	.0005886	Cubic Ft./Sec.
Litres/min.	.004403	Gals./Sec.
Litres/sec. (L/S)	2.119	Cubic Ft./Min.

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CONVERSION FACTORS

Multiply	By	To Obtain
$\frac{\text{Width (in) x thickness (in.)}}{12}$	Length (ft.)	Board Feet
Metres	100.	Centimetres
Metres	3.281	Feet
Metres	39.37	Inches
Metres	.001	Kilometres
Metres	1,000.	Millimetres
Metres	1.094	Yards
Metres/min.	1.667	Centimetres/Sec.
Metres/min.	3.281	Feet/min.
Metres/min.	.05468	Feet/sec.
Metres/min.	.06	Kilometres/hr.
Metres/min.	.03728	Miles/hr.
Metres/sec.	196.8	Feet/min.
Metres/sec.	3.281	Feet/sec.
Metres/sec.	3.6	Kilometres/hr.
Metres/sec.	.06	Kilometres/min.
Metres/sec.	2.237	Miles/hr.
Metres/sec.	.03728	Miles/min.
Microns	.0000010	Metres
Miles	160,900.	Centimetres
Miles	5,280.	Feet
Miles	1.609	Kilometres
Miles	1,760.	Yards
Miles	1,900.8	Varas (Texas)
Mile (nautical)	6080.27	Feet
Mile (nautical)	1.15	Mile (statute)
Miles/hr.	44.70	Centimetres/sec.
Miles/hr.	88.	Feet/min.
Miles/hr.	1.467	Feet/sec.
Miles/hr.	1.609	Kilometres/hrs.
Miles/hr.	.8684	Knots
Miles/hr.	26.82	Metres/min.
Miles/min.	2,682.	Centimetres/sec.
Miles/min.	88.	Feet/sec.
Miles/min.	1.609	Kilometres/min.
Miles/min.	60.	Miles/hr.

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CONVERSION FACTORS

Multiply	By	To Obtain
Milliers	1,000.	Kilograms
Milligrams	.0010	Grams
Millilitres	.0010	Litres
Millimetres	.1	Centimetres
Millimetres	.03937	Inches
Milligrams/litre	1.	Parts/million
Million gals/day	1.54723	Cubic feet/sec.
Miner's inches	1.5	Cubic ft./min.
Minutes (angle)	.0002909	Radians
Ounces	16.	Drams
Ounces	437.5	Grains
Ounces	.0625	Pounds
Ounces	28.349527	Grams
Ounces	.9115	Ounces (troy)
Ounces	.0000279	Tons (long)
Ounces	.00002835	Tons (metric)
Ounces. troy	480.	Grains
Ounces. troy	20.	Pennyweights (troy)
Ounces. troy	.08333	Pounds (troy)
Ounces. troy	31.103481	Grams
Ounces. troy	1.09714	Ounces (avoir.)
Ounces (fluid)	1.805	Cubic Inches
Ounces (fluid)	.02957	Litres
Ounces/sq.inch	.0625	Lbs.sq. in.
Parts/million	.0584	Grains/U.S. Gal.
Parts/million	.07016	Grains/Imperial Gal.
Parts/million	8.345	Lbs./million gal.
Pennyweights (troy)	24.	Grains
Pennyweights (troy)	1.55517	Grams
Pennyweights (troy)	.05	Ounces (troy)
Pennyweights (troy)	.0041667	Pounds (troy)
Pounds	16.	Ounces
Pounds	256.	Drams
Pounds	7,000.	Grains

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CONVERSION FACTORS

Multiply	By	To Obtain
Pounds	.0005	Tons (short)
Pounds	453.5924	Grams
Pounds	1.21528	Pounds (troy)
Pounds	14.5833	Ounces (troy)
Pounds (troy)	5760.	Grains
Pounds (troy)	240.	Pennyweights (troy)
Pounds (troy)	12.	Ounces (troy)
Pounds (troy)	373.24177	Grams
Pounds (troy)	.822857	Pounds (avoir.)
Pounds (troy)	13.1657	Ounces (avoir.)
Pounds (troy)	.00036735	Tons (long)
Pounds (troy)	.00041143	Tons (short)
Pounds (troy)	.00037324	Tons (metric)
Pounds of water	.01602	Cubic feet
Pounds of water	27.68	Cubic inches
Pounds of water	.1198	Gallons
Pounds/cubic foot	.01602	Grams/cubic cm.
Pounds/cubic foot	16.02	Kgs./cubic metre
Pounds/cubic foot	.0005787	Lbs./cubic inch
Pounds/cubic inch	27.68	Grams/cubic cm.
Pounds/cubic inch	27,680.	Kgs./cubic metre
Pounds/cubic inch	1,728.	Lbs./cubic foot
Pounds of water/min.	.000267	Cubic ft./sec.
Pounds/foot	1.488	Kgs./metre
Pounds/gallon	8.337	Grams/cubic cm.
Pounds/inch	178.6	Grams/cm.
Pounds/sq. foot	.01602	Feet of water
Pounds/sq. foot	.0004883	Kgs./sq. cm.
Pounds/sq. foot	.006945	Pounds/sq. inch
Pounds/sq. inch	.06804	Atmospheres
Pounds/sq. inch	2.307	Feet of water
Pounds/sq. inch	2.036	Inches of Mercury
Pounds/sq. inch	.07031	Kgs./sq. cm.
Quarts (dry)	67.20	Cubic inches

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CONVERSION FACTORS

Multiply	By	To Obtain
Quarts (liquid)	57.75	Cubic inches
Quarts (liquid)	.946	Litre
Quintal	.50802	CWT (hundred weight)
Quintal (Argentine)	101.28	Pounds
Quintal (Brazil)	129.54	Pounds
Quintal (Castile, Peru)	101.43	Pounds
Quintal (Chile)	101.41	Pounds
Quintal (Mexico)	101.47	Pounds
Quintal (metric)	220.46	Pounds
Rod	16.5	Feet
Rod	25.	Links
Square centimetre	.1550	Square inch
Square foot	.0929	Square metre
Square foot	.1296	Square vara (Texas)
Square inch	6.452	Square centimetres
Square kilometre	.3861	Square mile
Square metre	10.76	Square feet
Square mile	2.590	Square kilometres
Square vara (Texas)	7.716	Square feet
Square mile	640.	Acre
Temp. (°C) +273	1.	Abs. temp. (°C.)
Temp. (°C) +17.78	1.8	Temp. (°F.)
Temp. (°F) +460	1.	Abs. temp (°F)
Temp. (°F) -32	.5555	Temp. (°C)
Tons (long)	1,016.	Kilograms
Tons (long)	2.240.	Pounds
Tons (long)	1.12000	Tons (short)
Tons (metric)	1,000.	Kilograms
Tons (metric)	2,205.	Pounds

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EXACT WEIGHTS & MEASURES

Metric Measures			UK and American Measures		
Length					
1 millimetre (mm)		= 0.0394 in	1 inch (in)		= 25.4 mm
1 centimetre (cm)	= 10 mm	= 0.3937 in	1 foot (ft)	= 12 in	= 0.03048 m
1 metre (m)	= 100 cm	= 1.0936 yd	1 yard (yd)	= 3 ft	= .9144m
1 kilometre (km)	= 1000 m	= 0.62137 mile	1 mile (mi)	= 1760 yd	= 1.60934 km
			1 int nautical mile	= 2025.4 yd	= 1.852 km
Area					
1 sq cm (cm^2)	= 100 mm^2	= 0.1550 in^2	1 sq inch (in^2)		= 645.16 mm^2
1 sq metre (m^2)	= 10,000 cm^2	= 1.1960 yd^2	1 sq yard (yd^2)	= 9 ft^2	= 0.8361 m^2
1 hectare (ha)	= 10,000 m^2	= 2.471 acres	1 acre	= 4840 yd^2	= 4046.86 m^2
1 sq km (km^2)	= 100 ha	= 0.3861 $mile^2$	1 sq mile ($mile^2$)	= 640 acres	= 2.590 km^2
Volume/Capacity					
1 cu cm (cm^3)		= 0.0610 in^3	1 cu foot (ft^3)	= 1728 in^3	= 0.0283 m^3
1 cu decimetre (dm^3)	= 1000 cm^3	= 1.816 US dry pt	1 cu yard (yd^3)	= 27 ft^3	= .07646 m^3
1 cu metre (m^3)	= 1000 dm^3	= 1.3080 yd^3	1 US dry pint	= 33.6 in^3	= 0.5506 l
1 litre (l)	= 1 dm^3	= 0.2642 US gal	1 US bushel	= 64 US dry pt	= 35.239 l
1 hectolitre (hl)	= 100 l	= 2.8378 US bu	1 US liquid pint	= 0.8327 UK pt	= 0.4732 l
			1 US gallon	= 8 US liq pt	= 3.7854 l
			1 UK pint (pt)	= 1.2001 US dry pt	= 0.5683 l
			1 UK gallon (gal)	= 1.2001 US gal	= 4.5461 l
			1 US fluid ounce (fl oz)	= 1.8047 in^3	= 29.574 cm^3
			1 UK fluid ounce (fl oz)	= 1.8047 in^3	= 28.413 cm^3
Mass (Weight)					
1 metric carat	= 0.2 g	= 3.0865 gr	1 grain (gr)		= 64.799 mg
1 gram (g)	= 5 met carat	= 0.0353 oz	1 ounce (oz)	= 437.5 gr	= 28.3495 mg
1 kilogram (kg)	= 1000 g	= 2.20462 lb	1 pound (lb)	= 16 oz	= 0.45359 kg
1 tonne (t)	= 1000 kg	= 1.1023 short tons	1 short cwt	= 100 lb	= 45.359 kg
1 tonne (t)		= 0.9842 UK ton	1 long cwt	= 112 lb	= 50.802 kg

ITEM	TRADITIONAL UNIT	SI UNIT	CONVERSION FACTOR	EXAMPLE
General Information				
Date	April 6, 1991	1991-04-06		
Time	5:15 pm	17:15		
Drilling Data				
Bit Size	in	millimetre	25.4	7-7/8'' = 200 mm
Weight of bit	lb	decanewton	0.444	20,000 lb = 8880 daN
Depth & Footage	ft	metre	0.3048	1.500' = 457 m
Nozzle size	32nds	millimetre	0.794	10-11-16 = 7.9-8.7 - 12.7
Nozzle velocity	ft/sec	metre per second	0.03048	330 ft/sec = 100 m/s
DP & DC size	in	millimetre	25.4	4-1/2'' = 114 mm
DP & DC length	ft	metre	0.0348	6,700' = 2042 m
Pump & Hydraulics				
Liner Size	in	millimetre	25.4	5-1/2'' = 139.7 mm
Rod diameter	in	millimetre	25.4	2-1/4'' = 57.2 mm
Stroke length	in	millimetre	25.4	16'' = 406.4 mm
Pump output	Gal/Min	Litre per minute	3.786	350 GPM = 1325.1 L/min
Pump pressure	psi	Kilopascal	6.894	2.470 psi = 17,028 kPa
Mud volume	bbl	cubic metre	0.159	2550 bbl = 405.5 m3
Annular velocity	ft/min	metre per minute	0.3048	150 ft/min = 45.7 m/min
Hydrostatic head	psi	kilopascal	6.894	3.969 psi = 27.363 kPa
Pressure loss	psi/ft	kilopascal per metre	22.62	0.488 psi/ft = 11.06 kPa/m
Hydraulic horsepower	HHP	kilowatt	0.746	600 HHP = 450 kW
Pressure loss at bit	psi	kilopascal	6.894	1,000 psi = 6.894 kPa
Horsepower at bit	HHP/sq in	kilowatt per square	0.115	10 HHP/in^3 = 1.15 kW/cm^3
Mud weight	ppg	centimetre	119.826	9.4 ppg = 1,126.4 kg/m^3
Funnel viscosity	sec/qt	Kilogram per cubic metre		as determined in s/l
		second per litre		Sec/Litre

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APPROXIMATE WEIGHTS & MEASURES

Length					
10 meters	= 32.8 ft	= 10.9 yds	10 ft	= 3 m	
100 meters	= 328 ft	= 109 yds	100 ft	= 30.5 m	
1000 meters	= 3280 ft	= 4/5 mi	1000 ft	= 305 m	
10 km		= 6-1/5 mi	5280 ft (1 mi)	= 1609 m	= 1.6 km
100 km		= 62 mi	5 mi	= 8 km	
250 km		= 155 mi	50 mi	= 80 km	
500 km		= 310 mi	500 mi	= 805 km	
Area					
1 ha		= 2.5 acres	1 acre		= 2/5 ha
10 ha		= 25 acres	10 acres		= 4 ha
100 ha		= 247 acres	160 acres		= 64-3/4 ha
1000 ha		=3-3/4 sections	640 acres	= 1 section	= 259 ha
Volume/Capacity					
1 m^3	= 35 ft^3	= 1.3 yd^3	1 ft^3	= 1.20 m^3	
10 m^3	= 353 ft^3	= 13 yds^3	10 ft^3	= 1/2 m^3	
100 m^3	= 3532 ft^3	= 131 yds^3	100 ft^3	= 5 m^3	
1000 m^3	= 35,316 ft^3	= 1308 yd^3	1000 ft^3	= 48 m^3	
Mass (Weight)					
1 kg		= 2.2 lbs	1 lb	= 1/2 kg	
10 kg		= 22 lbs	10 lbs	= 4-1/2 kg	
100 kg		= 220 lbs	100 lbs	= 45 kg	
1000 kg	= 1 t	= 2205 lbs	1000 lbs	= 450 1/2 kg	
10,000 kg		= 9.8 t	2000 lbs	= 907 kg	= 9/10 t
			5 tons	= 4500 kg	= 4-1/2 t
			10 tons	= 9070 kg	= 9 t

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TEMPERATURE CONVERSION OF FAHRENHEIT TO CENTIGRADE

Fahrenheit	Centigrade	Fahrenheit	Centigrade	Fahrenheit	Centigrade
+300°	+148.89°	+180°	+82.22°	+60°	+15.56°
+295°	+146.11°	+175°	+79.44°	+55°	+12.78°
+290°	+143.33°	+170°	+76.67°	+50°	+10.00°
+285°	+140.55°	+165°	+73.89°	+45°	+7.22°
+280°	+137.78°	+160°	+71.11°	+40°	+4.44°
+275°	+135.00°	+155°	+68.33°	+35°	+1.67°
+270°	+132.22°	+150°	+65.55°	+30°	-1.11°
+265°	+129.44°	+145°	+62.78°	+25°	-3.89°
+260°	+126.67°	+140°	+60.00°	+20°	-6.67°
+255°	+123.89°	+135°	+57.22°	+15°	-9.44°
+250°	+121.11°	+130°	+54.44°	+10°	-12.22°
+245°	+118.33°	+125°	+51.67°	+5°	-15.00°
+240°	+115.55°	+120°	+48.89°	0°	-17.78°
+235°	+112.78°	+115°	+46.11°	-5°	-20.56°
+230°	+110.00°	+110°	+43.33°	-10°	-23.33°
+225°	+107.22°	+105°	+40.56°	-15°	-26.11°
+220°	+104.44°	+100°	+37.78°	-20°	-28.89°
+215°	+101.67°	+95°	+35.00°	-25°	-31.67°
+210°	+98.89°	+90°	+32.22°	-30°	-34.44°
+205°	+96.11°	+85°	+29.44°	-35°	-37.22°
+200°	+93.33°	+80°	+26.67°	-40°	-40.00°
+195°	+90.55°	+75°	+23.89°	-45°	-42.78°
+190°	+87.78°	+70°	+21.11°	-50°	-45.56°
+185°	+85.00°	+65°	+18.33°		

Formulas For Conversion Of Fahrenheit And Centigrade Temperature Readings

$$°F = \frac{[\ °C \times 9]}{5} + 32$$

$$°C = \frac{[\ °F - 32]}{9} \times 5$$

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FLUID DENSITY AND PRESSURE
(AT 60°F)

		Density			Fluid Head		
Degrees API	Specific Gravity	lb/gal	lb/cu ft	g/cc	psi/ft	kg/sq cm/m	Buoyancy Factor*
60	0.738	6.160	46.08	**0.738**	0.320	**.0738**	0.905
55	0.758	6.325	47.31	**0.758**	0.328	**.0758**	0.903
50	0.779	6.499	48.62	**0.779**	0.336	**.0779**	0.900
45	0.801	6.683	49.99	**0.801**	0.347	**.0801**	0.897
40	0.825	6.878	51.45	**0.825**	0.357	**.0825**	0.894
35	0.849	7.085	53.00	**0.849**	0.368	**.0849**	0.891
30	0.876	7.304	54.64	**0.876**	0.379	**.0876**	0.888
25	0.904	7.537	56.38	**0.904**	0.391	**.0904**	0.884
20	0.933	7.786	58.24	**0.933**	0.404	**.0933**	0.880
15	0.965	8.052	60.23	**0.965**	0.418	**.0965**	0.876
10	1.000	8.337	62.36	**1.000**	0.433	**.1000**	0.872
	1.007	8.400	62.83	**1.007**	0.436	**.1007**	0.871
	1.031	8.600	64.33	**1.031**	0.446	**.1031**	0.868
	1.055	8.800	65.82	**1.055**	0.457	**.1055**	0.865
	1.079	9.000	67.32	**1.079**	0.467	**.1079**	0.862
	1.103	9.200	68.82	**1.103**	0.477	**.1103**	0.859
	1.127	9.400	70.31	**1.127**	0.488	**.1127**	0.856
	1.151	9.600	71.81	**1.151**	0.498	**.1151**	0.852
	1.175	9.800	73.30	**1.175**	0.509	**.1175**	0.849
	1.199	10.000	74.80	**1.199**	0.519	**.1199**	0.846
	1.233	10.200	76.30	**1.223**	0.529	**.1223**	0.843
	1.247	10.400	77.79	**1.247**	0.540	**.1247**	0.840
	1.271	10.600	79.29	**1.271**	0.550	**.1271**	0.837
	1.295	10.800	80.78	**1.295**	0.561	**.1295**	0.834
	1.319	11.000	82.28	**1.319**	0.571	**.1319**	0.831
	1.343	11.200	83.78	**1.343**	0.581	**.1343**	0.828
	1.367	11.400	85.27	**1.367**	0.592	**.1367**	0.825
	1.391	11.600	86.77	**1.391**	0.602	**.1391**	0.822
	1.415	11.800	88.27	**1.415**	0.612	**.1415**	0.819
	1.439	12.000	89.76	**1.439**	0.623	**.1439**	0.816
	1.463	12.200	91.26	**1.463**	0.633	**.1463**	0.813
	1.487	12.400	92.75	**1.487**	0.644	**.1487**	0.810
	1.511	12.600	94.25	**1.511**	0.654	**.1511**	0.806
	1.535	12.800	95.75	**1.535**	0.664	**.1535**	0.803
	1.559	13.000	97.24	**1.559**	0.675	**.1559**	0.800

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FLUID DENSITY AND PRESSURE
(AT 60°F)

		Density			Fluid Head		
Degrees API	Specific Gravity	lb/gal	lb/cu ft	g/cc	psi/ft	kg/sq cm/m	Buoyancy Factor*
	1.583	13.200	98.74	**1.583**	0.685	**.1583**	0.797
	1.607	13.400	100.23	**1.607**	0.696	**.1607**	0.794
	1.631	13.600	101.73	**1.631**	0.706	**.1631**	0.791
	1.655	13.800	103.23	**1.655**	0.716	**.1655**	0.788
	1.679	14.000	104.72	**1.679**	0.727	**.1679**	0.785
	1.703	14.200	106.22	**1.703**	0.737	**.1703**	0.782
	1.727	14.399	107.71	**1.727**	0.748	**.1727**	0.779
	1.751	14.600	109.21	**1.751**	0.758	**.1751**	0.776
	1.775	14.800	110.71	**1.775**	0.768	**.1775**	0.773
	1.799	15.000	112.20	**1.799**	0.779	**.1799**	0.770
	1.823	15.200	113.70	**1.823**	0.789	**.1823**	0.767
	1.847	15.400	115.20	**1.847**	0.799	**.1847**	0.764
	1.871	15.600	116.69	**1.871**	0.810	**.1871**	0.761
	1.895	15.800	118.19	**1.895**	0.820	**.1895**	0.757
	1.919	16.000	119.68	**1.919**	0.831	**.1919**	0.754
	1.943	16.200	121.18	**1.943**	0.841	**.1943**	0.751
	1.967	16.400	122.68	**1.967**	0.851	**.1967**	0.748
	1.991	16.600	124.17	**1.991**	0.862	**.1991**	0.745
	2.015	16.800	125.67	**2.015**	0.872	**.2015**	0.742
	2.039	17.000	127.16	**2.039**	0.883	**.2039**	0.739
	2.063	17.200	128.66	**2.063**	0.893	**.2063**	0.736
	2.087	17.400	130.16	**2.087**	0.903	**.2087**	0.733
	2.111	17.600	131.65	**2.111**	0.914	**.2111**	0.730
	2.135	17.800	133.15	**2.135**	0.924	**.2135**	0.727
	2.159	18.000	134.64	**2.159**	0.935	**.2159**	0.724
	2.183	18.200	136.14	**2.183**	0.945	**.2183**	0.721
	2.207	18.400	137.64	**2.207**	0.955	**.2207**	0.718
	2.231	18.600	139.13	**2.231**	0.966	**.2231**	0.715
	2.255	18.800	140.63	**2.255**	0.976	**.2255**	0.712
	2.278	19.000	142.12	**2.278**	0.987	**.2278**	0.708
	2.302	19.200	143.62	**2.302**	0.997	**.2302**	0.705
	2.326	19.400	145.12	**2.326**	1.007	**.2326**	0.702
	2.350	19.600	146.61	**2.350**	1.018	**.2350**	0.699
	2.374	19.800	148.11	**2.374**	1.028	**.2374**	0.696
	2.398	20.000	149.61	**2.398**	1.038	**.2398**	0.693

* Buoyancy factor is used to compensate for loss of weight when steel tubulars are immersed in fluid. .....

Applicable only when tubing or casing is completely filled with fluid.

Actual hook load = length of string (ft) x weight of string (lb/ft) x Buoyancy Factor.

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TUBING MOVEMENT FORMULAS

Changes in temperature and pressure cause contraction or expansion of a tubing string as covered in detail in the Baker "Packer Calculation Handbook". For ready reference, the formulas for calculating the forces developed by this contraction/ expansion are given below:

F_1 (piston effect) = $(A_p - A_j)\ \Delta P_j - (A_p - A_o)\ \Delta P_o$

F_2 (buckling effect) = usually negligible

F_3 (ballooning effect) = $.6\ (\Delta P_{ja} A_j - \Delta P_{oa} A_o)$

F_4 (temperature effect) = $207\ A_s\ \Delta t$

The above forces are in pounds and the equivalent tubing movement can be obtained from the stretch charts in another section of this handbook or can be calculated using the formula:

$$\Delta L \text{ (stretch or contraction in feet)} = \frac{F \times L}{E \times A_s}$$

where F = force in pounds

L = tubing length in feet

E = elasticity factor of steel = 30,000,000

A_s = cross section area of tubing in sq. inches

Terms used in the force formulas are defined below:

A_s = cross section area of tubing in square inches = $A_o - A_j$

A_p = area of packer bore in square inches

ΔA_o = area of tubing OD in square inches

ΔA_j = area or tubing ID in square inches

ΔP_j = change in tubing pressure at packer in pounds per square inch

ΔP_o = change in annulus pressure at packer in pounds per square inch

P_{ja} = change in average tubing pressure in pounds per square inch

P_{oa} = change in average annulus pressure in pounds per square inch

Δt = change in average tubing temperature in degrees Fahrenheit

For more detailed information regarding tubing movement refer to the Baker "Packer Calculation Handbook."

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GAS FLOW THROUGH CHOKE

A calculation of the volume of gas flowing through a choke may be made using the formula:

$$Q = \frac{CP}{\sqrt{GT}}$$

Where Q = gas flow rate in MCF per day at 60°F and atmospheric pressure
C = choke coefficient, listed in table below for various size chokes
P = absolute flowline pressure upstream of choke, gauge reading plus 15 psi
G = gas specific gravity
T = absolute gas temperature upstream of choke, °F plus 460

If neither temperature nor specific gravity are known, an approximation can be made by assuming a temperature of 80°F (540°F absolute) and a specific gravity of 0.6 for the gas. In this case the formula will be:

$$Q = \frac{CP}{\sqrt{540 \times .6}} = \frac{CP}{18} = .0555\ C\ P$$

COEFFICIENT TABLE

Choke Size (in.)	Coefficient (C)
1/8	6.25
3/16	14.44
1/4	26.51
5/16	43.64
3/8	61.21
7/16	85.13
1/2	112.72
5/8	179.74
3/4	260.99

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CLASS A CEMENT SLURRY

Slurry Weight (lb/gal.)	Mixing Water (gal./sack)	Yield (cu ft/sack)	Factor (sack/cu ft)
14.0	7.72	1.512	0.661
14.1	7.53	1.487	0.673
14.2	7.34	1.461	0.684
14.3	7.15	1.436	0.697
14.4	6.98	1.413	0.708
14.5	6.80	1.389	0.720
14.6	6.64	1.368	0.731
14.7	6.48	1.346	0.743
14.8	6.32	1.325	0.755
14.9	6.17	1.305	0.766
15.0	6.02	1.285	0.778
15.1	5.90	1.267	0.789
15.2	5.74	1.247	0.802
15.3	5.61	1.230	0.813
15.4	5.48	1.212	0.825
15.5	5.35	1.195	0.837
15.6	5.23	1.179	0.848
15.7	5.11	1.163	0.860
15.8	4.99	1.147	0.872
15.9	4.88	1.132	0.883
16.0	4.77	1.118	0.895
16.1	4.66	1.103	0.907
16.2	4.56	1.089	0.918
16.3	4.46	1.076	0.929
16.4	4.36	1.063	0.941
16.5	4.26	1.049	0.953
16.6	4.16	1.036	0.965
16.7	4.07	1.024	0.977
16.8	3.98	1.012	0.988
16.9	3.89	1.000	1.000

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CAPACITY OF VERTICAL CYLINDRICAL TANKS

Inside Diameter Ft.	In.	Bbl/In.	Gal/In.	Cu Ft/In
4	0	.186	7.83	1.05
4	3	.210	8.84	1.18
4	6	.236	9.91	1.33
4	9	.263	11.05	1.48
5	0	.291	12.24	1.64
5	3	.321	13.50	1.80
5	6	.352	14.81	1.98
5	9	.385	16.19	2.16
6	0	.419	17.63	2.36
6	3	.455	19.13	2.56
6	6	.492	20.69	2.77
6	9	.531	22.31	2.98
7	0	.571	23.99	3.21
7	3	.612	25.74	3.44
7	6	.655	27.54	3.68
7	9	.700	29.41	3.93
8	0	.746	31.33	4.19
8	3	.793	33.32	4.46
8	6	.842	35.37	4.73
8	9	.892	37.49	5.01
9	0	.944	39.66	5.30
9	3	.997	41.89	5.60
9	6	1.05	44.19	5.91
9	9	1.11	46.54	6.22
10	0	1.17	48.96	6.54
10	3	1.22	51.44	6.88
10	6	1.28	53.98	7.22
10	9	1.35	56.58	7.56
11	0	1.41	59.24	7.92
11	3	1.47	61.97	8.28
11	6	1.54	64.75	8.66
11	9	1.61	67.60	9.04
12	0	1.68	70.50	9.43
12	3	1.75	73.47	9.82
12	6	1.82	76.50	10.23
12	9	1.89	79.59	10.64
13	0	1.97	82.74	11.06
13	3	2.05	85.96	11.49
13	6	2.12	89.23	11.93
13	9	2.20	92.57	12.37
14	0	2.28	95.96	12.83
14	3	2.37	99.42	13.29
14	6	2.45	102.94	13.76
14	9	2.54	106.52	14.24
15	0	2.62	110.16	14.73
15	3	2.71	113.86	15.22
15	6	2.80	117.63	15.72
15	9	2.89	121.45	16.24
16	0	2.98	125.34	16.76
16	3	3.08	129.29	17.28
16	6	3.17	133.29	17.82
16	9	3.27	137.36	18.36
17	0	3.37	141.49	18.92
17	3	3.47	145.69	19.48
17	6	3.57	149.95	20.04
17	9	3.67	154.26	20.62
18	0	3.78	158.66	21.21
18	3	3.88	163.07	21.80
18	6	3.99	167.57	22.40
18	9	4.10	172.13	23.01
19	0	4.21	176.75	23.63
19	3	4.32	181.43	24.25
19	6	4.43	186.17	24.89
19	9	4.54	190.98	25.53
20	0	4.66	195.84	26.18
20	3	4.78	200.77	26.84
20	6	4.90	205.75	27.51
20	9	5.02	210.80	28.18
21	0	5.14	215.91	28.86
21	3	5.26	221.09	29.56
21	6	5.39	226.32	30.25
21	9	5.51	231.61	30.96
22	0	5.64	236.97	31.68
22	3	5.77	242.38	32.40
22	6	5.90	247.86	33.13
22	9	6.03	253.40	33.87
23	0	6.16	259.00	34.62
23	3	6.30	264.66	35.38
23	6	6.43	270.38	36.15
23	9	6.57	276.17	36.92
24	0	6.71	282.01	37.70
24	3	6.85	287.92	38.49
24	6	6.99	293.88	39.29
24	9	7.15	300.40	40.16
25	0	7.28	306.00	40.91
25	3	7.43	312.15	41.73
25	6	7.58	318.36	42.56
25	9	7.72	324.64	43.40
26	0	7.88	330.97	44.24
26	3	8.03	337.37	45.10
26	6	8.18	343.82	45.96
26	9	8.34	350.34	46.83
27	0	8.49	356.92	47.71
27	3	8.65	363.56	48.60
27	6	8.81	370.26	49.50
27	9	8.97	377.02	50.40
28	0	9.13	383.85	51.31
28	3	9.30	390.73	52.23
28	6	9.46	397.68	53.16
28	9	9.63	404.69	54.10
29	0	9.80	411.75	55.04
29	3	9.97	418.88	56.00
29	6	10.14	426.07	56.96
29	9	10.31	433.33	57.93
30	0	10.49	440.64	58.91

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CAPACITY OF BOLTED STEEL TANKS, 42 - GAL. BBL.

100 and 200 BBL. A.P.I. Tanks				
		Net	Net Less	
Ft.	Gross	Gross Less Deadwood	2 Percent	3 Percent
1	11.9151	11.9113	11.6731	11.5540
2	23.8302	23.8226	23.3461	23.1079
3	35.7453	35.3339	35.0192	34.6619
4	47.6604	45.6452	46.6923	46.2158
5	59.5754	59.5565	58.3654	57.7698
6	71.4905	71.4678	70.0384	69.3238
7	83.4056	83.3791	81.7115	80.8777
8	95.3207	95.2904	93.3846	92.4317
9	107.2358	107.2017	105.0577	103.9856
10	119.1509	119.1130	116.7307	115.5396
11	131.0660	131.0243	128.4038	127.0936
12	142.9811	142.9356	140.0769	138.6475
13	154.8962	154.8469	151.7500	150.2015
14	166.8113	166.7582	163.4230	161.7554
15	178.7263	178.6695	175.0961	173.3094
16	190.6414	190.5608	186.7692	184.8634

250 and High 500 BBL. A.P.I. Tanks				
		Net	Net Less	
Ft.	Gross	Gross Less Deadwood	2 Percent	3 Percent
1	33.1123	33.1047	32.4426	32.1116
2	66.2247	66.2093	64.8851	64.2230
3	99.3370	99.3140	97.3277	96.3346
4	132.4494	132.4187	129.7703	128.4461
5	165.5617	165.5234	162.2129	160.5577
6	198.6740	198.6280	194.6554	192.6692
7	231.7864	231.7327	227.0980	224.7807
8	264.8987	264.8374	259.5407	256.8923
9	298.0110	297.9421	291.9833	289.0038
10	331.1234	331.0467	324.4258	321.1153
11	364.2357	364.1514	356.8684	353.2269
12	397.3481	397.2561	389.3110	385.3384
13	430.4604	430.3607	421.7535	417.4499
14	463.5727	463.4654	454.1961	449.5614
15	496.6851	496.5701	486.6387	481.6730
16	529.7974	529.6748	519.0813	513.7846

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CAPACITY OF BOLTED STEEL TANKS, 42 - GAL. BBL.

Low 500 and High 1,000 A.P.I. Tanks				
		Net	Net Less	
Ft.	Gross	Gross Less Deadwood	2 Percent	3 Percent
1	64.9129	64.8946	63.5967	62.9478
2	129.8258	129.7892	127.1934	125.8955
3	194.7387	194.6838	190.7901	188.8433
4	259.6516	259.5784	254.3868	251.7910
5	324.5645	324.4730	317.9835	314.7388
6	389.4774	389.3676	381.5802	377.6866
7	454.3903	454.2623	445.1771	440.6344
8	519.3032	519.1569	508.7738	503.5822
9	584.2161	584.0515	572.3705	566.5300
10	649.1290	648.9461	635.9672	629.4777
11	714.0419	713.8407	699.5639	692.4255
12	778.9548	778.7353	763.1606	755.3732
13	843.8676	843.6299	826.7573	818.3210
14	908.7805	908.5245	890.3540	881.2688
15	973.6934	973.4191	953.9507	944.2165
16	1038.6063	1038.3137	1017.5474	1007.1643

Low 1,000 And 2,000 BBL. A.P.I. Tanks				
		Net	Net Less	
Ft.	Gross	Gross Less Deadwood	2 Percent	3 Percent
1	123.5476	123.5113	121.0411	119.8060
2	247.0953	247.0226	242.0822	239.6119
3	370.6429	370.5339	363.1232	359.4179
4	494.1906	494.0452	484.1643	479.2239
5	617.7382	617.5565	605.2054	599.0298
6	741.2858	741.0678	726.2465	718.8358
7	864.8335	864.5791	847.2875	838.6418
8	988.3811	988.0904	968.3286	958.4477
9	1111.9288	1111.6017	1089.3697	1078.2537
10	1235.4764	1235.1130	1210.4108	1198.0597
11	1359.0240	1358.6243	1331.4519	1317.8656
12	1482.5717	1482.1357	1452.4929	1437.6716
13	1608.1193	1605.6470	1573.5340	1557.4775
14	1729.6670	1729.1583	1694.5751	1677.2835
15	1853.2146	1852.6696	1815.6162	1797.0895
16	1976.7622	1976.1809	1936.6572	1916.8954

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5,000 BBL. A.P.I. Tank				
		Net	Net Less	
Ft	Gross	Gross Less Deadwood	2 Percent	3 Percent
1	208.8062	208.7513	204.5763	202.4888
2	417.6125	417.5027	409.1526	404.9776
3	626.4187	626.2540	613.7289	607.4663
4	835.2249	835.0053	818.3052	809.9551
5	1044.0312	1043.7566	1022.8815	1012.4439
6	1252.8374	1252.5080	1227.4578	1214.9327
7	1461.6437	1461.2593	1432.0341	1417.4215
8	1670.4499	1670.0106	1636.6104	1619.9103
9	1879.2561	1878.7619	1841.1867	1822.3990
10	2088.0624	2087.5133	2045.7630	2024.8878
11	2296.8686	2296.2646	2250.3393	2227.3766
12	2505.6748	2505.0159	2454.9156	2429.8654
13	2714.4811	2713.7672	2659.4919	2632.3542
14	2923.2873	2922.5186	2864.0682	2834.8430
15	3132.0936	3131.2699	3068.6445	3037.3317
16	3340.8998	3340.0212	3273.2208	3239.8205
17	3549.7060	3548.7725	3477.7971	3442.3093
18	3758.5123	3757.5239	3682.3734	3644.7981
19	3967.3185	3966.2752	3886.9497	3847.2869
20	4176.1247	4175.0265	4091.5260	4049.7757
21	4384.9310	4383.7778	4296.1023	4252.2644
22	4593.7372	4592.5292	4500.6786	4454.7532
23	4802.5435	4801.2805	4705.2549	4657.2420
24	5011.3497	5010.0318	4909.8312	4859.7308

10,000 BBL. A.P.I. Tank				
		Net	Net Less	
Ft	Gross	Gross Less Deadwood	2 Percent	3 Percent
1	422.8328	422.7239	414.2695	410.0422
2	845.6656	845.4479	828.5389	820.0845
3	1268.4984	1268.1718	1242.8084	1230.1267
4	1691.3311	1690.8958	1657.0779	1640.1689
5	2114.1639	2113.6197	2071.3474	2050.2111
6	2536.9967	2536.3437	2485.6168	2460.2534
7	2959.8295	2959.0676	2899.8863	2870.2956
8	3382.6623	3381.7916	3314.1558	3280.3378
9	3805.4951	3804.5155	3728.4252	3690.3801
10	4228.3278	4227.2395	4142.6947	4100.4223
11	4651.1606	4649.9634	4556.9642	4510.4645
12	5073.9934	5072.6874	4971.2337	4920.5068
13	5496.8262	5495.4113	5385.5031	5330.5490
14	5919.6590	5918.1353	5799.7726	5740.5912
15	6342.4918	6340.8592	6214.0421	6150.6334
16	6765.3246	6763.5832	6628.3115	6560.6757
17	7188.1573	7186.3071	7042.5810	6970.7179
18	7610.9901	7609.0311	7456.8505	7380.7601
19	8033.8229	8031.7550	7871.1199	7790.8024
20	8456.6557	8454.4790	8285.3894	8200.8446
21	8879.4885	8877.2029	8699.6589	8610.8868
22	9302.3213	9299.9269	9113.9284	9020.9291
23	9725.1541	9722.6508	9528.1978	9430.9713
24	10147.9867	10145.3748	9942.4673	9841.0135

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FORMULAS FOR CALCULATING CAPACITY OF VERTICAL CYLINDRICAL TANKS WITH FLAT ENDS

Bbl per foot of depth of fluid	= .1400 x D^2 (ft)
Bbl per inch of depth of fluid	= .01165 x D^2 (ft)
Gal per foot of depth of fluid	= 5.8752 x D^2 (ft)
Gal per inch of depth of fluid	= .4896 x D^2 (ft)
Cu. Ft. per foor of depth of fluid	= .7854 x D^2 (ft)
Cu. Ft. per inch of depth of fluid	= .06545 x D^2 (ft)

D = Diameter in feet.

FORMULAS FOR CALCULATING CAPACITY OF RECTANGULAR TANKS AND PITS

For small or medium size rectangular tanks or pits measure the length and width in inches.

Bbl. per inch of depth of fluid	= .0001031 x L (in) x W (in)
Gal. per inch of depth of fluid	= .004329 x L (in) x W (in)
Cu. ft. per inch of depth of fluid	= .005787 x L (in) x W (in)
L = Length in inches.	W = Width in inches

For large tanks or pits measure length and width in feet.

Bbl. per inch of depth of fluid	= .01484 x L (ft) x W (ft)
Gal. per inch of depth of fluid	= .6234 x L (ft) x W (ft)
Cu. ft. per inch of depth of fluid	= .08333 x L (ft) x W (ft)

FORMULAS FOR CALCULATING CONTENTS OF PIPE LINES

Barrels per lineal ft.	= .0009714 x D^2
Lineal ft. per barrel	= $\frac{1029.4}{D^2}$
Gallon per lineal ft.	= .0408 x D^2
Lineal ft. per gallon	= $\frac{183.35}{= .005454 \times D^2}$
Cu. ft. per lineal ft.	
Lineal ft. per cu. ft.	

D = Diameter in inches

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STANDARD PORTABLE OILFIELD TANK REFERENCE DATA

Dimension, Weight And Volume Data*							
Size		100 BBL ($15.9m^3$)	210 BBL ($33.4m^3$)	400 BBL ($63.6m^3$)	500 BBL ($79.5m^3$)	750 BBL ($119.3m^3$)	1,000 BBL ($159.0m^3$)
Dimensions	Diameter X Height	9'6'' x 8'0'' **2.90m x 2.44m**	10'0'' x 15'0'' **3.04m x 4.58m**	12'0'' x 20'0'' **3.66m x 6.56m**	15'6'' x 16'0'' **4.72m x 4.88m**	15'3'' x 24'0'' **4.65m x 7.32m**	17'3'' x 24'0'' (high) 21'6'' x 16'0'' (low) **5.26m x 7.32m** (high) **6.56m x 4.88m** (low)
Weight	**Standard** Shell 3/16'' **4.8mm**	3,272 lbs	5,283 lbs	8,218 lbs	9,850 lbs	12,720 lbs	14,955 lbs (high)
	Roof 3/16'' **4.8mm** Floor 1/4'' **6.4mm**	**1,487 kg**	**2,401 kg**	**3,735 kg**	**4,477 kg**	**5,782 kg**	**6,798 kg**
Weight	**Heavy Duty** Shell 1/4'' **6.4mm**			10,545 lbs	12,447 lbs	16,291 lbs	19,081 (high) 18,850 (low)
	Roof 1/4'' **6.4mm** Floor 1/4'' **6.4mm**			**4,793 kg**	**5,658 kg**	**7,405 kg**	**8,673 kg (high) 8,568 kg (low)**
Volume	Imperial gal/ft.	441.5	489.2	704.5	1,175.3	1,137.7	1,455.7 (high) 2,261.4 (low)
	bbl/ft	12.62	13.99	20.14	33.61	32.53	41.62 (high) 64.66 (low)
	m^3/ft	**2.01**	**2.24**	**3.20**	**5.34**	**5.17**	**6.62 (high) 10.35 (low)**
	m^3/m	**6.61**	**7.26**	**10.52**	**17.50**	**16.98**	**21.73 (high) 33.80 (low)**

*Figures may vary due to changes in tank diameter, height and wall thickness.

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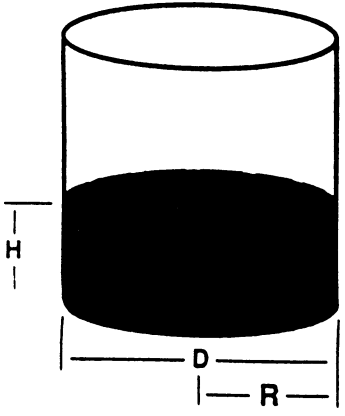
FORMULAS FOR CALCULATING VERTICAL CYLINDRICAL TANK VOLUMES

$V = \pi R^2 H$ ($\pi = 3.14159$) $R = D/2$



Conversion Factors

1 cubic foot = 0.028 cubic metres
1 cubic foot = 7.48 Imperial gallons
1 cubic foot = .214 barrels
1 cubic metre = 35.3147 cubic feet
1 cubic metre = 6.29 barrels
1 cubic metre = 220.2 Imperial gallons
1 barrel = 35 Imperial gallons
1 barrel = 0.159 cubic metres
1 barrel = 5.615 cubic feet

Capacity Per Vertical Foot

D = diameter in feet

barrels = $0.1398854 \times D^2$

imperial gallons = $4.892148 \times D^2$

cubic metres = $0.022240 \times D^2$

Capacity For Vertical Metre

D = diameter in metres

cubic metres = $0.785398 \times D^2$

barrels = $4.940153 \times D^2$

imperial gallons = $172.93803 \times D^2$

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FORMULAS FOR CALCULATING HORIZONTAL CYLINDRICAL TANK VOLUMES

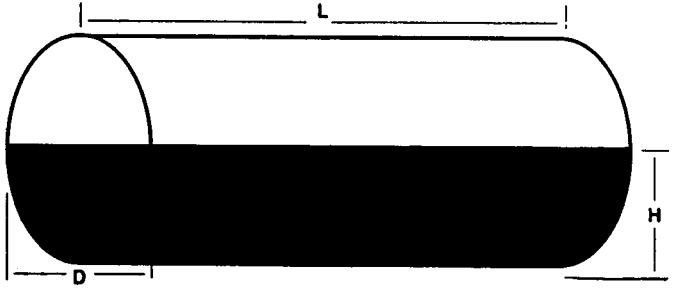
To Calculate Partial Volume

Partial Volume =

Cylindrical Coefficient (H/D)

x Total Volume (V)

$$V = \frac{\pi LD^2}{4}$$



CYLINDRICAL COEFFICIENT (H/D)

H/D		H/D		H/D		H/D		H/D		H/D	
.00	.000000	.10	.052044	.20	.142378	.30	.252315	.40	.373530	.50	.500000
.01	.001692	.11	.059850	.21	.152659	.31	.264039	.41	.386030	.51	.512731
.02	.004773	.12	.067972	.22	.163120	.32	.275869	.42	.398577	.52	.525459
.03	.008742	.13	.076393	.23	.173753	.33	.287795	.43	.411165	.53	.538175
.04	.013417	.14	.085094	.24	.184550	.34	.299814	.44	.423788	.54	.550875
.05	.018692	.15	.094061	.25	.195501	.35	.311918	.45	.436445	.55	.563555
.06	.024496	.16	.103275	.26	.206600	.36	.324104	.46	.449125	.56	.576212
.07	.030772	.17	.112728	.27	.217839	.37	.336363	.47	.461825	.57	.588835
.08	.037478	.18	.122403	.28	.229209	.38	.348690	.48	.474541	.58	.601423
.09	.044579	.19	.132290	.29	.240703	.39	.361082	.49	.487269	.59	.613970

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FORMULAS FOR CALCULATING HORIZONTAL CYLINDRICAL TANK VOLUMES

SAFETY RECOMMENDATIONS FOR GAUGING TANKS

1. Alberta Occupational Health and Safety regulations state that if a tank contains a potentially hazardous substance, the operator shall ensure that all workers are notified.
2. When gauging tanks, workers should not walk directly on the tank top.
3. When the release of sour gas is possible, the workers must wear respiratory protective equipment (mask up) while tank gauging, and don breathing apparatus a minimum of 25 metres (75 feet) from the tank.
4. When breathing equipment is used in tank gauging operations, a second air line must be run to the tank top prior to gauging.
5. The "buddy system" (two workers, one watching the other) should be employed during all tank gauging operations.

MUD PIT CALCULATION

.0833 x L x W (ft.) = Cu. Ft./In.
.0148 x L x W (ft.) = BBLS./In.
.00058 x L x W (in.) = Cu. Ft./In.

ROUND TANK VOLUMES

.001181 x (Circ. Ft. x Circ. Ft.) = BBLS/In.
.006631 x (Circ. Ft. x Circ. Ft.) = Cu. Ft./In.
.0654 x (Dia. Ft. x Dia. Ft.) = Cu.Ft./In.
.0016 x (Dia. Ft. x Dia. Ft.) = BBLS/In.
.4905 x (Dia. Ft. x Dia. Ft.) = Gals/In.

PIPE VOLUMES

.00097 x (Dia. In. x Dia. In.) = BBLS/Ft.
.00545 x (Dia. In. x Dia. In.) = Cu. Ft./Ft.

CAPACITY OF LINE PIPE OR HOSE

2'' .....02 Cu. Ft./Ft.
2-1/2'' .....03 Cu. Ft./Ft.
3'' ..... .04 Cu. Ft./Ft.

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PHYSICAL PROPERTIES OF CALCIUM CHLORIDE SOLUTIONS

Sp. Gr. @ 68°F	Anhydrous $CaCl_2$ Content Of Brine		Solution Weight		Pounds Western Calcium Chloride (1) To Make Solution		Pounds Eastern Calcium Chloride (2) To Make Solution		Freezing Point °F
	% By Wt.	Grains/Gal.	Lbs. / Gal.	Lbs. / Cu. Ft.	Per Gal.	Per Cu. Ft.	Per Gal.	Per Cu. Ft.	
1.008	1.0	589	8.41	62.93	.11	.85	.11	.80	-.3
1.015	2.0	1,186	8.47	63.37	.23	1.70	.22	1.62	-.7
1.024	3.0	1,795	8.55	63.93	.35	2.59	.33	2.44	-1.2
1.032	4.0	2,411	8.61	64.43	.46	3.48	.44	3.29	-1.6
1.040	5.0	3,038	8.68	64.93	.59	4.39	.55	4.14	-2.1
1.084	10.0	6,329	9.05	67.67	1.22	9.14	1.15	8.61	-5.3
1.130	15.0	9,902	9.43	70.55	1.91	14.30	1.80	13.48	-10.3
1.178	20.0	13,755	9.83	73.54	2.66	19.87	2.50	18.73	-18.0
1.228	25.0	17,941	10.25	76.66	3.46	25.90	3.26	24.41	-29.1
1.282	30.0	22,463	10.70	80.04	4.34	32.45	4.09	30.58	-51
1.337	35.0	27,342	11.16	83.47	5.28	39.47	4.98	37.21	-5.4
1.396	40.0	32,613	11.65	87.15	6.29	47.06	5.94	44.40	+40

(1) Western calcium chloride flake contains 73-75% calcium chloride.

(2) Eastern calcium chloride flake contains 77-80% calcium chloride.

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WEIGHTS OF SALT-WATER SOLUTIONS

Sp. Gr.	% NaCl	Ppm	Gr./Gal.	Wt. of Solution		Wt. of Salt	
				#/Gal.	#/Cu. Ft.	#/Bbl.	#/Gal.
1.0053	1	10,048	587	8.389	62.70	3.52	0.0839
1.0125	2	20,251	1,183	8.449	63.15	7.10	0.1690
1.0268	4	41,563	2,428	8.569	64.04	14.4	0.3428
1.0413	6	62,481	3,650	8.690	64.94	21.9	0.5214
1.0559	8	84,460	4,934	8.811	65.85	29.6	0.7049
1.0707	10	107,090	6,256	8.935	66.78	37.5	0.8935
1.0857	12	130,285	7,611	9.060	67.71	45.7	1.087
1.1009	14	154,079	9,001	9.187	68.66	54.0	1.286
1.1162	16	178,575	10,432	9.315	69.61	62.6	1.490
1.1319	18	203,687	11,899	9.446	70.59	71.4	1.700
1.1478	20	229,587	13,412	9.578	71.58	80.5	1.916
1.1640	22	256,085	14,960	9.714	72.59	89.8	2.137
1.1804	24	283,286	16,549	9.850	73.62	99.3	2.364
1.1972	26	311,274	18,184	9.991	74.66	109.1	2.598

Note: Specific gravity of sea water is 1.025 at 39.2°F

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DRILLING MUD CONVERSION TABLE

Wt. Per Gallon	Wt. Per Cu. Ft.	Specific Gravity	Lbs./Sq.In. Per Ft. Depth
8.34	62.4	1.00	.433
8.6	64.3	1.03	.447
8.8	65.8	1.05	.457
09.0	67.3	1.08	.468
9.4	70.3	1.13	.488
9.6	71.8	1.15	.499
9.8	73.3	1.17	.509
10.0	74.8	1.20	.519
10.4	77.8	1.25	.540
10.6	79.3	1.27	.551
10.8	80.8	1.29	.561
11.0	82.3	1.32	.571
11.4	85.3	1.37	.592
11.6	86.8	1.39	.603
11.8	88.3	1.41	.613
12.0	89.8	1.44	.623
12.4	92.8	1.49	.644
12.8	95.8	1.53	.665
13.0	97.2	1.56	.675
13.4	100.2	1.61	.696
13.8	103.2	1.65	.717
14.0	104.7	1.68	.727
14.5	108.5	1.74	.753
15.0	112.2	1.80	.779
15.5	115.9	1.86	.805
16.0	119.7	1.92	.831
16.5	123.4	1.98	.857

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OIL CONVERSION TABLE

A.P.I. Gravity	Specific Gravity	Wt. Per Gallon	Lbs./Sq. In. Per Ft. Depth
12	.986	8.23	.427
15	.966	8.06	.419
18	.946	7.90	.410
20	.934	7.79	.405
22	.922	7.69	.399
24	.910	7.59	.394
26	.898	7.49	.389
28	.887	7.40	.384
30	.876	7.31	.380
31	.871	7.26	.377
32	.865	7.22	.375
33	.860	7.18	.373
34	.855	7.13	.370
35	.850	7.09	.368
36	.845	7.05	.366
37	.840	7.00	.364
38	.835	6.96	.362
39	.830	6.92	.360
40	.825	6.88	.358
41	.820	6.84	.355
42	.816	6.80	.353
43	.811	6.76	.351
44	.806	6.73	.349
46	.797	6.65	.345
50	.780	6.50	.338

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MUD WEIGHT COMPARISON TABLE

Lbs./Gal.	Lbs./Cu. Ft.	Sp. Gr.	Lbs./Gal.	Lbs./Cu.Ft.	Sp. Gr.
7.0	52.36	0.84	10.5	78.54	1.26
7.1	53.11	0.85	10.6	79.29	1.27
7.2	53.86	0.86	10.7	80.04	1.28
7.3	54.60	0.88	108	80.78	1.30
7.4	55.35	0.89	10.9	81.53	1.31
7.5	56.10	0.90	11.0	82.38	1.32
7.6	56.85	0.91	11.1	83.03	1.33
7.7	57.60	0.92	11.2	83.78	1.34
7.8	58.34	0.94	11.3	84.52	1.36
7.9	59.09	0.95	11.4	85.27	1.37
8.0	59.84	0.96	11.5	86.02	1.38
8.1	60.59	0.97	11.6	86.77	1.39
8.2	61.34	0.98	11.7	87.52	1.40
8.3	62.08	0.996	11.8	88.26	1.42
8.34	62.38	1.00	11.9	89.01	1.43
8.4	62.83	1.00			
8.5	63.58	1.02	12.0	89.76	1.44
8.6	64.33	1.03	12.1	90.51	1.45
8.7	65.08	1.04	12.2	91.26	1.46
8.8	65.82	1.06	12.3	92.00	1.48
8.9	66.57	1.07	12.4	92.75	1.49
9.0	67.32	1.08	12.5	93.50	1.50
9.1	68.07	1.09	12.6	94.25	1.51
9.2	68.82	1.10	12.7	95.00	1.52
9.3	69.56	1.12	12.8	95.74	1.54
9.4	70.31	1.13	12.9	96.49	1.55
9.5	71.06	1.14	13.0	97.24	1.56
9.6	71.81	1.15	13.1	97.99	1.57
9.7	72.56	1.16	13.2	98.74	1.58
9.8	73.30	1.18	13.3	99.48	1.60
9.9	74.05	1.19	13.4	100.23	1.61
10.0	74.70	1.20	13.5	100.98	1.62
10.1	75.55	1.21	13.6	101.73	1.63
10.2	76.30	1.22	13.7	102.48	1.64
10.3	77.04	1.24	13.8	103.22	1.66
10.4	77.79	1.25	13.9	103.97	1.67

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MUD WEIGHT COMPARISON TABLE

Lbs./Gal.	Lbs./Cu. Ft.	Sp. Gr.	Lbs./Gal.	Lbs./Cu.Ft.	Sp. Gr.
14.0	104.72	1.68	17.0	127.16	2.04
14.1	105.47	1.69	17.1	127.91	2.05
14.2	106.22	1.70	17.2	128.66	2.06
14.3	106.96	1.72	17.3	129.40	2.08
14.4	107.71	1.73	17.4	130.15	2.09
14.5	108.46	1.74	17.5	130.90	2.10
14.6	109.21	1.75	17.6	131.65	2.11
14.7	109.96	1.76	17.7	132.40	2.12
14.8	110.70	1.78	17.8	133.14	2.14
14.9	111.45	1.79	17.9	133.89	2.15
15.0	112.20	1.80	18.0	134.64	2.16
15.1	112.95	1.81	18.1	135.39	2.17
15.2	113.70	1.82	18.2	136.14	2.18
15.3	114.44	1.84	18.3	136.88	2.20
15.4	115.19	1.85	18.4	137.63	2.21
15.5	115.94	1.86	18.5	138.38	2.22
15.6	116.69	1.87	18.6	139.13	2.23
15.7	117.44	1.88	18.7	139.88	2.24
15.8	118.18	1.90	18.8	140.92	2.26
15.9	118.93	1.91	18.9	141.37	2.27
16.0	119.68	1.92	19.0	142.12	2.28
16.1	120.43	1.93	19.1	142.87	2.29
16.2	121.18	1.94	19.2	143.62	2.30
16.3	121.92	1.96	19.3	144.36	2.32
16.4	122.67	1.97	19.4	145.11	2.33
16.5	123.42	1.98	19.5	145.86	2.34
16.6	124.17	1.99	19.6	146.61	2.35
16.7	124.92	2.00	19.7	147.36	2.36
16.8	125.66	2.02	19.8	148.10	2.38
16.9	126.41	2.03	19.9	148.85	2.39
			20.0	149.60	2.40

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OIL, WATER AND MUD SPECIFIC GRAVITY - WEIGHT AND PRESSURE TABLE

Degrees A.P.I.	Specific Gravity	Weight(Density) Gallon (Pounds)	Weight(Density) Cubic Foot (Pounds)	Weight(Density) Barrel (Pounds)	Fluid Head Pressure Per Foot (Lbs. Sq. In.)	Fluid Head Height Per Pound (Feet)	Buoyancy Factor * Totally Immersed
60	.739	6.16	46.1	259.	.320	3.13	.908
55	.759	6.33	47.4	266.	.329	3.04	.903
50	.780	6.51	48.7	273.	.338	2.96	.901
45	.802	6.69	50.0	281.	.348	2.87	.898
50	.825	6.88	51.5	289.	.357	2.80	.895
35	.850	7.09	53.0	298.	.368	2.72	.892
30	.876	7.31	54.7	307.	.380	2.63	.889
25	.904	7.54	56.4	317.	.392	2.55	.885
20	.934	7.79	58.3	327.	.405	2.47	.881
15	.966	8.06	60.3	339.	.419	2.39	.877
10° A.P.I. or	1.00	8.34	62.4	350.	.433	2.31	.873
Pure Water	1.01	8.4	62.8	353.	.436	2.29	.872
	1.03	8.6	64.3	361.	.447	2.24	.869
	1.06	8.8	65.8	370.	.457	2.19	.866
	1.08	9.0	67.3	378.	.468	2.14	.862
	1.10	9.2	68.8	386.	.478	2.09	.860
	1.13	9.4	70.3	395.	.488	2.05	.856
Salt Water	1.15	9.6	71.8	403.	.499	2.00	.853
	1.154	9.625	72.0	404.	.500	2.00	.853
	1.18	9.8	73.3	412.	.509	1.96	.850
	1.20	10.0	74.8	420.	.519	1.93	.847
	1.22	10.2	76.3	428.	.530	1.89	.844
	1.25	10.4	77.8	437.	.540	1.85	.841
	1.27	10.6	79.3	445.	.551	1.81	.838
	1.29	10.8	80.8	454.	.561	1.78	.835
	1.32	11.0	82.3	462.	.571	1.75	.832
	1.34	11.2	83.8	470.	.582	1.72	.829
	1.37	11.4	85.8	479.	.592	1.69	.826
	1.39	11.6	86.8	487.	.603	1.66	.823
	1.41	11.8	88.3	496.	.613	1.63	.820
	1.44	12.0	89.8	504.	.623	1.61	.817
	1.46	12.2	91.3	512.	.634	1.58	.814
	1.49	12.4	92.8	521.	.644	1.55	.810
	1.51	12.6	94.3	529.	.655	1.53	.808
	1.53	12.8	95.8	538.	.665	1.50	.804
	1.56	13.0	97.3	546.	.675	1.48	.801
	1.58	13.2	98.7	554.	.686	1.46	.798
	1.61	13.4	100.	563.	.696	1.44	.795
	1.63	13.6	102.	571.	.706	1.42	.792
	1.65	13.8	103.	580.	.717	1.39	.789
	1.68	14.0	105.	588.	.727	1.38	.786
	1.70	14.2	106.	596.	.738	1.36	.783
	1.73	14.4	108.	605.	.748	1.34	.780
	1.75	14.6	109.	613.	.758	1.32	.777
	1.77	14.8	111.	622.	.769	1.30	.774
	1.80	15.0	112.	630.	.779	1.28	.771
	1.82	15.2	114.	638.	.790	1.27	.768
	1.85	15.4	115.	647.	.800	1.25	.765
	1.87	15.6	117.	655.	.810	1.23	.762
		15.8	118.	664.	.821	1.22	.759

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OIL, WATER AND MUD SPECIFIC GRAVITY - WEIGHT AND PRESSURE TABLE

Degrees A.P.I.	Specific Gravity	Weight(Density) Gallon (Pounds)	Weight(Density) Cubic Foot (Pounds)	Weight(Density) Barrel (Pounds)	Fluid Head Pressure Per Foot (Lbs. Sq. In.)	Fluid Head Height Per Pound (Feet)	Buoyancy Factor * Totally Immersed
† Common Cement Slurry	1.92	16.0	120.	672.	.831	1.20	.755
	1.94	16.2	121.	680.	.842	1.19	.753
	1.97	16.4	123.	689.	.852	1.17	.749
	1.99	16.6	124.	697.	.862	1.16	.746
	2.01	16.8	126.	706.	.873	1.15	.743
	2.04	17.0	127.	714.	.883	1.13	.740
	2.06	17.2	129.	722.	.894	1.12	.737
	2.09	17.4	130.	731.	.904	1.11	.734
	2.11	17.6	132.	739.	.914	1.09	.731
	2.13	17.8	133.	748.	.925	1.08	.728
	2.16	18.0	135.	756.	.935	1.07	.725
	2.18	18.2	136.	764.	.945	1.06	.722
	2.21	18.4	138.	773.	.956	1.05	.719
	2.23	18.6	139.	781.	.966	1.04	.716
	2.25	18.8	141.	790.	.977	1.02	.713
	2.28	19.0	142.	798.	.987	1.01	.710
	2.30	19.2	144.	806.	.997	1.00	.707
	2.33	19.4	145.	815.	1.01	.992	.704
	2.35	19.6	147.	823.	1.02	.982	.701
	2.37	19.8	148.	832.	1.03	.972	.698
	2.40	20.0	150.	840.	1.04	.962	.694
	2.42	20.2	151.	848.	1.05	.953	.692
	2.45	20.4	153.	857.	1.06	.943	.688
	2.47	20.6	154.	865.	1.07	.935	.685
	2.49	20.8	156.	874.	1.08	.925	.682
	2.52	21.0	157.	882.	1.09	.917	.679
	2.54	21.2	159.	890.	1.10	.908	.676
	2.57	21.4	160.	899.	1.11	.899	.673
	2.59	21.6	162.	907.	1.12	.891	.670
	2.61	21.8	163.	916.	1.13	.883	.667

Specific Gravity 60°/60°F = $\frac{141.5}{131.5 + Ga.}$

Ga = Degrees A.P.I. = $\frac{141.5}{\text{Sp. Gr. } 60°/60°F} - 131.5$

Rough Temperature Correction (for Oil): For temperature not far from 60°F., an approximate correction to 60°F may be made by deducting 1° A.P.I. for each 13° F. that the observed temperature is above 60°F. or adding 1° A.P.I. for each 13°F. below.

*** Buoyancy Factor** is for converting weight of steel in air to weight in liquid - for checking dead weight on hook. Actual load = length of string x weight per foot x buoyancy factor. (Applies only to strings of pipe which are completely filled with mud, while handling).

Calculations based on 1 cubic foot of water = 62.4 pounds.

† Slurry giving 1.1 cubic foot (per sack of cement) after setting.

Engineering data from Spang Chalfant, Division of The National Supply Co.

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DUPLEX PUMP OUTPUT*

Volumes Indicated Are One Complete Cycle Or Revolution And Represent Four Individual Pump Strokes

*Multiply output/cycle by pump rpm to get vol./min.

		100 % Efficiency		90 % Efficiency	
Bore	**Stroke**	**Cu. Ft.**	**Bbls.**	**Cu. Ft.**	**Bbls.**
4''	8''	.2328	.0413	.2095	.0372
4-1/2''	8''	.2944	.0526	.2650	.0473
5''	8''	.3637	.0648	.3274	.0603
4''	10''	.2910	.0517	.2619	.0465
4-1/2''	10''	.3680	.0660	.3312	.0594
5''	10''	.4547	.0810	.4092	.0729
5''	12''	.5456	.0972	.4909	.0875
6''	12''	.7854	.1396	.7069	.1256
6-1/2''	12''	.9217	.1580	.8295	.1422
7''	12''	1.069	.1904	.9621	.1714
7-1/2''	12''	1.227	.2184	1.104	.1966
5''	16''	.7272	.1296	.6545	.1206
6''	16''	1.047	.1861	.9423	.1675
6-1/2''	16''	1.229	.2187	1.106	.1968
7''	16''	1.425	.2539	1.283	.2285
7-1/2''	16''	1.636	.2912	1.572	.2621
5''	18''	.8181	.1458	.7363	.1312
6''	18''	1.178	.2094	1.060	.1885
6-1/2''	18''	1.383	.2460	1.245	.2214
7''	18''	1.604	.2856	1.444	.2570
7-1/2''	18''	1.841	.3276	1.657	.2948
7''	20''	1.782	.3173	1.604	.2856
7-1/2''	20''	2.046	.3640	1.841	.3276
8''	20''	2.330	.4147	2.095	.3732
8-1/2''	20''	2.630	.4680	2.361	.4212
7''	24''	2.138	.3808	1.924	.3427
7-1/2''	24''	2.455	.4368	2.210	.3931
8''	24''	2.792	.4976	2.513	.4478
8-1/2''	24''	3.153	.5616	2.838	.5054
9''	24''	3.534	.6296	3.181	.5666

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TRIPLEX PUMP OUTPUT*

Volumes Indicated Are For One Complete Cycle Or Revolution

* 1. Multiply output/cycle by pump rpm to get vol./min. 2. For quintuplex pump, multiply output by 1.67

		100 % Efficiency		90 % Efficiency	
Stroke	**Bore**	**Cu. Ft.**	**Bbls.**	**Cu. Ft.**	**Bbls.**
3''	4''	.0491	.0087	.0442	.0078
3-1/4''	4''	.0576	.0103	.0518	.0093
3-1/2''	4''	.0668	.0119	.0601	.0107
3-3/4''	4''	.0767	.0137	.0690	.0123
4''	4''	.0873	.0155	.0786	.0140
4-1/2''	4''	.1104	.0197	.0994	.0177
5''	4''	.1364	.0243	.1228	.0219
6''	4''	.1963	.0350	.1767	.0315
8''	4''	.3491	.0622	.3142	.0560
3''	6''	.0737	.0131	.0663	.0117
3-1/4''	6''	.0864	.0155	.0777	.0140
3-1/2''	6''	.1002	.0179	.0902	.0161
3-3/4''	6''	.1151	.0206	.1035	.0185
4''	6''	.1310	.0233	.1179	.0210
4-1/2''	6''	.1656	.0291	.1491	.0266
5''	6''	.2046	.0365	.1842	.0329
6''	6''	.2945	.0525	.2651	.0473
8''	6''	.5237	.0933	.4713	.0840
3''	8''	.0982	.0174	.0884	.0156
3-1/4''	8''	.1152	.0206	.1036	.0186
3-1/2''	8''	.1336	.0238	.1202	.0214
3-3/4''	8''	.1534	.0274	.1380	.0246
4''	8''	.1746	.0310	.1572	.0280
4-1/2''	8''	.2208	.0384	.1988	.0354
5''	8''	.2728	.0586	.2456	.0438
6''	8''	.3926	.0700	.3534	.0630
8''	8''	.6982	.1244	.6284	.1120
3''	10''	.1228	.0218	.1105	.0195
3-1/4''	10''	.1440	.0258	.1295	.0233
3-1/2''	10''	.1670	.0298	.1503	.0268
3-3/4''	10''	.1918	.0343	.1725	.0308
4''	10''	.2183	.0388	.1965	.0350
4-1/2''	10''	.2760	.0478	.2485	.0443
5''	10''	.3410	.0708	.3070	.0548
6''	10''	.4908	.0875	.4418	.0788
8''	10''	.8728	.1555	.7855	.1400

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FORMULAS

Area Of Circle = Dia. x Dia x .7854
Area Of Circle = Rad. x Rad. x 3.1416
Circum. Of Circle = Dia. x 3.1416

BOTTOM HOLE PRESSURES (HYDROSTATIC)

For Water

.434 x Depth	Lbs./Sq. In.
62.4 x Depth	Lbs./Sq. Ft.
For Mud Column (Or All Fluids)	
0.052 x Depth x Wt. Mud	Lbs./Sq. In.
For Oil Column	
.434 x Depth x Sp. Gr.	Lbs./Sq. In.

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DIAMETER- AREA TABLES

Dia.	Area
2	3.14
2-1/8	3.55
2-1/4	3.98
2-3/8	4.43
2-1/2	4.91
2-5/8	5.41
2-3/4	5.94
2-7/8	6.49
3	7.07
3-1/8	7.67
3-1/4	8.30
3-3/8	8.95
3-1/2	9.62
3-5/8	10.32
3-3/4	11.04
3-7/8	11.79
4	12.57
4-1/8	13.36
4-1/4	14.19
4-3/8	15.03
4-1/2	15.90
4-5/8	16.80
4-3/4	17.72
4-7/8	18.67
5	19.63
5-1/8	20.63
5-1/4	21.65
5-3/8	22.69
5-1/2	23.76
5-5/8	24.85
5-3/4	25.97
5-7/8	27.11
6	28.27
6-1/8	29.46
6-1/4	30.68
6-3/8	31.92

Dia.	Dia.
6-1/2	33.18
6-5/8	34.47
6-3/4	35.78
6-7/8	37.12
7	38.48
7-1/8	39.87
7-1/4	41.28
7-3/8	42.72
7-1/2	44.18
7-5/8	45.66
7-3/4	47.17
7-7/8	48.71
8	50.27
8-1/8	51.85
8-1/4	53.46
8-3/8	55.09
8-1/2	56.75
8-5/8	58.43
8-3/4	60.13
8-7/8	61.86
9	63.62
9-1/8	65.40
9-1/4	67.20
9-3/8	69.03
9-1/2	70.88
9-5/8	72.76
9-3/4	74.66
9-7/8	76.59
10	78.54
10-1/8	80.52
10-1/4	82.52
10-3/8	84.54
10-1/2	86.59
10-5/8	88.66
10-3/4	90.76
10-7/8	92.89

Diameter squared (in inches) x .0408 = Gals. per ft. of depth.

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TABLE OF FORMULA

Normal Formation Pressure 10.52 kPa/m

1. **Hydrostatic Pressure** (kPa) = Mud Density (kg/m^3) x Depth (m) x 0.00981

2. **Gradient** (kPa/m) = Mud Density (kg/m^3) x 0.00981

3. **Hydrostatic Pressure** (kPa) = Gradient (kPa/m) x Depth (m)

4. **Formation Pressure** (kPa) = Hydrostatic Pressure (kPa) + SIDPP (kPa)

5. **Mud Density Increase** (kg/m^3) = $\dfrac{\text{SIDPP (kPa)}}{\text{(Depth (m) x .000981)}}$

6. **Barite Required** (kg/m^3) = $\dfrac{\text{(4250 x Density Increase)}}{\text{(4250 - New Mud Density)}}$

where - Density Increase in kg/m^3 is the necessary mud density increase to balance SIDPP

- New Mud Density in kg/m^3 is equal to the original mud density added to the density increase

7. **Total Barite Required** (kg) = Barite Required (kg/m^3) x Total Volume (m^3)

8. **Number of sacks** = $\dfrac{\text{Total Barite Required (kg)}}{\text{40 kg/sack}}$

9. **Mixing Rate** (sack/min) = $\dfrac{\text{Number of sacks}}{\text{Reduced Circulation Time (min)}}$

10. **Initial Circulation Pressure** (kPa) RSPP + SIDPP

11. **Final Circulation Pressure** (kPa) = $\dfrac{\text{(RSPP x New Mud Density)}}{\text{Old Mud Density}}$

12. **Trip Margin Increase** (kg/m^3) = $\dfrac{\text{Trip Margin Pressure (kPa)}}{\text{(Depth (m) x 0.00981)}}$

13. **Final Density** (kg/m^3) = Mud Density to Kill (kg/m^3) + Trip Margin Increase (kg/m^3)

14. **Leak-Off Gradient** (kPa/m) = $\dfrac{\text{[Hydrostatic Pressure at shoe (kPa) + Leak-off Pressure (kPa)]}}{\text{Depth of Casing Seat (m)}}$

15. **Leak-off Pressure** at Casing Seat = Leak-off Gradient (kPa/m) x Depth of Casing Seat (m)

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FORMULAS FOR CALCULATING VELOCITY AND HORSEPOWER

$$\text{Feet per second} = \frac{\text{B.P.H.} \times .2859}{(\text{Diameter in inches})^2}$$

$$\text{Feet per second} = \frac{\text{B.P.D.} \times .0119}{(\text{Diameter in inches})^2}$$

$$\text{Feet per second} = \frac{\text{G.P.M.} \times .4085}{(\text{Diameter in inches})^2}$$

$$\text{Hydraulic Horsepower} = \frac{\text{B.P.H.} \times \text{Pressure (psi)}}{2447}$$

Hydraulic Horsepower = B.P.H. x Pressure (psi) x .000409

Hydraulic Horsepower = B.P.D. x Pressure (psi) x .000017

Hydraulic Horsepower = B.P.M. x Pressure (psi) x .0245

Hydraulic Horsepower = G.P.M. x Pressure (psi) x .000584

$$\text{Brake Horsepower} = \frac{\text{B.P.H.} \times \text{Pressure (psi)} \times .000409}{\text{Efficiency}}$$

$$\text{Brake Horsepower} = \frac{\text{B.P.D.} \times \text{Pressure (psi)} \times .000017}{\text{Efficiency}}$$

$$\text{Brake Horsepower} = \frac{\text{G.P.M.} \times \text{Pressure (psi)} \times .000584}{\text{Efficiency}}$$

NOTE:

B.P.M. = Barrels per minute
B.P.D.= Barrels per day
B.P.H. = Barrels per hour
psi = Pounds per square inch

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FORMULA FOR CALCULATING VOLUME AND HEIGHT

BETWEEN: TUBING AND HOLE
CASING AND HOLE
TUBING AND CASING
CASING AND CASING

Cu. ft. per lin. ft. = $(D^2 - d^2)\ 0.005454$

Lin. Ft. per cu. ft. = $\frac{183.35}{D^2 - d^2}$

Gallons per lin. ft. = $(D^2 - d^2)\ 0.0408$

Lin. ft. per gallon = $\frac{24.51}{D^2 - d^2}$

Barrels per lin. ft. = $(D^2 - d^2)\ 0.0009714$

Lin. ft. per barrel = $\frac{1029.4}{D^2 - d^2}$

Where:

For Volume and Height between Tubing and Hole
- D = Diameter of hole, inches
- d = Outside diameter of tubing, inches

For Volume and Height between Casing and Hole
- D = Diameter of hole, inches
- d = Outside diameter of casing, inches

For Volume and Height between Tubing and Casing
- D = Inside diameter of casing, inches
- d = Outside diameter of tubing, inches

For Volume and Height between Casings
- D = Inside diameter of outer casing, inches
- d = Outside diameter of inner casing, inches

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FORMULAS FOR VOLUME AND HEIGHT BETWEEN MULTIPLE TUBING STRINGS AND HOLE (OR CASING)

Cu. Ft. per lin. ft. $= (D^2 - nd^2)\ 0.005454$

Lin. ft. per cu. ft. $= \dfrac{183.35}{(D^2 - nd^2)}$

Gallons per lin. ft. $= (D^2 - nd^2)\ 0.0408$

Lin. ft. per gallon $= \dfrac{24.51}{(D^2 - nd^2)}$

Barrels per lin. ft. $= (D^2 - nd^2)\ 0.0009714$

Lin. ft. per barrel $= \dfrac{1029.4}{(D^2 - nd^2)}$

Where:

D = Diameter of hole, inches (or ID of casing)

d = Outside diameter of tubing, inches

n = Number of tubing strings

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80% EF

VOLUME BETWEEN DRILL COLLAR, DRILL PIPE & HOLE BASED ON LIN. FT. PER BBL

Drill Collar Size	Hole Size									
	6"	6-1/8'	6-1/4"	7-5/8"	7-7/8"	8-1/2"	8-3/4"	9"	12-1/4"	13-3/8"
4-3/4''	76.6	68.8	62.3	28.9	26.0					
5-3/4''				41.	35.5	26.2	23.6			
6''				46.4	39.5	28.3	25.3			
6-5/8''						36.2	31.5	27.4	9.6	7.6
7''						44.2	37.3	32.1	10.1	7.9
7-5/8''								45.	11.1	8.5
8''									11.6	8.9
8-5/8''									13.6	9.8
9''									14.9	10.5
Drill Pipe Size										
3-1/2''	43.3	40.8	38.4	22.4						
4-1/2''				27.3	24.6	19.8	18.2	16.9	7.9	6.1
5-1/2''						24.5	22.2	20.2	8.5	

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EFFECT OF DEPTH & MUD WEIGHT ON HYDROSTATIC PRESSURE
BOTTOMHOLE PRESSURE

Depth Of Well	Of a column of oil having an A.P.I. gravity of				Of a column of saltwater or rotary mud having a density in pounds per gallon of					
	50	40	30	20	Fresh Water	9	Salt Water	10	11	12
Feet	**Pounds Per Square Inch**									
1000	338	357	379	404	433	468	500	519	571	623
2000	676	714	758	808	866	936	1000	1038	1142	1246
3000	1014	1071	1137	1212	1299	1404	1500	1557	1713	1869
4000	1352	1428	1516	1616	1732	1872	2000	2076	2284	2492
5000	1690	1785	1895	2020	2165	2340	2500	2595	2855	3115
6000	2028	2142	2274	2424	2598	2808	3000	3114	3426	3738
7000	2366	2499	2653	2828	3031	3276	3500	3633	3997	4361
8000	2704	2856	3032	3232	3464	3744	4000	4152	4568	4984
9000	3042	3213	3411	3636	3897	4212	4500	4671	5139	5607
10000	3380	3570	3790	4040	4330	4680	5000	5190	5710	6230
Lbs. / Cu. Ft.	48.6	51.5	54.7	58.3	62.4	67.3	72.0	74.8	82.3	89.8
SP.GR.	.7796	.8251	.8762	.9340	1.00	1.08	1.154	1.20	1.32	1.44

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EFFECT OF DEPTH & MUD WEIGHT ON HYDROSTATIC PRESSURE
BOTTOMHOLE PRESSURE

Depth Of Well	Of a column of oil having an A.P.I. gravity of				Of a column of saltwater or rotary mud having a density in pounds per gallon of					
	50	40	30	20	Fresh Water	9	Salt Water	10	11	12
Feet	**Pounds Per Square Inch**									
11,000	3718	3927	4169	4444	4763	5148	5500	5709	6281	6853
12,000	4056	4284	4548	4848	5196	5616	6000	6228	6852	7476
13,000	4394	4641	4927	5252	5629	6084	6500	6747	7423	8099
14,000	4732	4998	5306	5656	6062	6552	7000	7266	7994	8722
15,000	5070	5355	5685	6060	6495	7020	7500	7785	8565	9345
16,000	5408	5712	6064	6464	6928	7488	8000	8304	9136	9968
17,000	5746	6069	6443	6868	7361	7956	8500	8823	9707	10591
18,000	6084	6426	6822	7272	7794	8424	9000	9342	10278	11214
19,000	6422	6783	7201	7676	8227	8892	9500	9861	10849	11837
20,000	6760	7140	7580	8080	8660	9360	10000	10380	11420	12460
Lbs. / Cu. Ft.	48.6	51.5	54.7	58.3	62.4	67.3	72.0	74.8	82.3	89.8
SP.GR.	.7796	.8251	.8762	.9340	1.00	1.08	1.154	1.20	1.32	1.44

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EFFECT OF DEPTH & MUD WEIGHT ON HYDROSTATIC PRESSURE
BOTTOMHOLE PRESSURE

Depth Of Well	Of a column of saltwater or rotary mud having a density in pounds per gallon of									
	13	14	15	16	17	18	19	20	21	22
Feet	Pounds Per Square Inch									
1000	675	727	779	831	883	935	987	1039	1091	1143
2000	1350	1454	1558	1662	1766	1870	1974	2078	2182	2286
3000	2025	2181	2337	2493	2649	2805	2961	3117	3273	3429
4000	2700	2908	3116	3324	3532	3740	3948	4156	4364	4572
5000	3375	3635	3895	4155	4415	4675	4935	5195	5455	5715
6000	4050	4362	4674	4986	5298	5610	5922	6234	6546	6858
7000	4725	5089	5453	5817	6181	6545	6909	7273	7637	8001
8000	5400	5816	6232	6648	7064	7480	7896	8312	8728	9144
9000	6075	6543	7011	7479	7947	8415	8883	9351	9819	10287
10000	6750	7270	7790	8310	8830	9350	9870	10390	10910	11430
Lbs. / Cu. Ft.	97.2	104.7	112.2	119.7	127.2	134.6	142.1	149.6	157.1	164.6
SP.GR.	1.56	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64

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EFFECT OF DEPTH & MUD WEIGHT ON HYDROSTATIC PRESSURE
BOTTOMHOLE PRESSURE

Depth Of Well	Of a column of saltwater or rotary mud having a density in pounds per gallon of									
	13	14	15	16	17	18	19	20	21	22
Feet	Pounds Per Square Inch									
11,000	7425	7997	8569	9141	9713	10285	10857	11429	12001	12573
12,000	8100	8724	9348	9972	10596	11220	11844	12468	13092	13716
13,000	8775	9451	10127	10803	11479	12155	12831	13507	14183	14859
14,000	9450	10178	10906	11634	12362	13090	13818	14546	15274	16002
15,000	10125	10905	11685	12465	13245	14025	14805	15585	16365	17145
16,000	10800	11632	12464	13296	14128	14960	15792	16624	17456	18288
17,000	11475	12359	13243	14127	15011	15895	16779	17663	18547	19431
18,000	12150	13086	14022	14958	15894	16830	17766	18702	19638	20574
19,000	12825	13813	14801	15789	16777	17765	18753	19741	20729	21717
20,000	13500	14540	15580	16620	17660	18700	19740	20780	21820	22860
Lbs. / Cu. Ft.	97.2	104.7	112.2	119.7	127.2	134.6	142.1	149.6	157.1	164.6
SP.GR.	1.56	1.68	1.80	1.92	2.04	2.16	2.28	2.40	2.52	2.64

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PSI PER BARREL

Mud Wt. API Gr. #/Gal.	psi/Ft.	2-3/8 EU Tubing 4.7 #/Ft.	2-7/8 EU Tubing 6.5 #/Ft.	2-7/8 IU Drill Pipe 10.4 #/Ft.	3-1/2 IU Drill Pipe 13.3 #/Ft.
API Gr.					
60	.320	82.7	55.2	72.2	43.5
55	.329	85.0	56.8	74.2	44.7
50	.338	87.3	58.3	76.2	46.0
48	.341	88.1	58.9	76.9	46.4
46	.345	89.1	59.5	77.8	47.0
44	.349	90.2	60.2	78.7	47.5
43	.351	90.7	60.6	79.2	47.7
Diesel					
42	.354	95.1	61.1	79.8	48.1
API Gr.					
41	.355	91.7	61.3	80.1	48.3
40	.357	92.2	61.6	80.5	48.6
39	.359	92.8	62.0	81.0	48.8
38	.362	93.5	62.5	81.6	49.2
37	.364	94.1	62.8	82.1	49.5
36	.366	94.6	63.2	82.5	49.8
35	.368	95.1	63.5	83.0	50.0
34	.370	95.6	63.9	83.4	50.3
33	.373	96.4	64.4	84.1	50.7
32	.375	96.9	64.7	84.6	51.0
31	.377	97.4	65.1	85.0	51.3
30	.379	97.9	65.4	85.5	51.5
28	.384	99.2	66.3	86.6	52.2
26	.389	100.5	67.1	87.7	52.9
24	.394	101.8	68.0	88.9	53.6
22	.399	103.1	68.9	90.0	54.3
20	.405	104.7	69.9	91.3	55.1
18	.410	105.9	70.8	92.5	55.8
15	.418	108.0	72.1	94.3	56.9
12	.427	110.3	73.7	96.3	58.1
10	.433	111.9	74.8	97.6	58.9

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PSI PER BARREL

Mud Wt. API Gr. #/Gal.	psi/Ft.	2-3/8 EU Tubing 4.7 #/Ft.	2-7/8 EU Tubing 6.5 #/Ft.	2-7/8 IU Drill Pipe 10.4 #/Ft.	3-1/2 IU Drill Pipe 13.3 #/Ft.
#/Gal.					
8.34	.433	111.9	74.8	97.6	58.9
9.0	.468	120.8	80.7	105.4	63.6
9.2	.478	123.5	82.5	107.8	65.0
9.4	.488	126.1	84.3	110.1	66.4
9.6	.499	128.8	86.1	112.4	67.8
9.8	.509	131.5	87.9	114.8	69.2
10.0	.519	134.2	89.7	117.1	70.7
10.2	.530	136.9	91.4	119.5	72.1
10.4	.540	139.6	93.2	121.8	73.5
10.6	.551	142.2	95.0	124.2	74.9
10.8	.561	144.9	96.8	126.5	76.3
11.0	.571	147.6	98.6	128.8	77.7
11.2	.582	150.3	100.4	131.2	79.1
11.4	.592	153.0	102.2	133.5	80.5
11.6	.603	155.7	104.0	135.9	82.0
11.8	.613	158.3	105.8	138.2	83.4
12.0	.623	161.0	107.6	140.6	84.8
12.2	.634	163.7	109.4	142.9	86.2
12.4	.644	166.4	111.2	145.2	87.6
12.6	.655	169.1	113.0	147.6	89.0
12.8	.665	171.8	114.8	149.9	90.4
13.0	.675	174.5	116.5	152.3	91.8
13.2	.686	177.1	118.3	154.6	93.3
13.4	.696	179.8	120.1	157.0	94.7
13.6	.706	182.5	121.9	159.3	96.1
13.8	.717	185.2	123.7	161.6	97.5
14.0	.727	187.9	125.5	164.0	98.9
14.5	.753	194.6	130.0	169.8	102.4
15.0	.779	201.3	134.5	175.7	106.0
15.5	.805	208.0	139.0	181.6	109.5
16.0	.831	214.7	143.4	187.4	113.0
16.5	.857	221.4	147.9	193.3	116.6
17.0	.883	228.1	152.4	199.1	120.1
17.5	.909	234.8	156.9	205.0	123.6
18.0	.935	241.5	161.4	210.8	127.2
18.5	.961	248.3	165.8	216.7	130.7
19.0	.987	255.0	170.3	222.6	134.2
19.5	1.01	261.7	174.8	228.4	137.8
20.0	1.04	268.4	179.3	234.3	141.3

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PRESSURE DROP ACROSS A SINGLE NOZZLE (ORIFICE)
(USING 10 LB/GAL MUD AND A NOZZLE COEFFICIENT OF .95)

VOLUME FLOW RATE (G) IN GPM	PRESSURE DROP IN PSI ACROSS NOZZLES OF DIAMETERS SHOWN BELOW (IN INCHES)								
	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8
30	68	37							
40	121	65							
50	189	102							
60	272	147	86						
70	370	200	117	73					
80	483	261	153	96	63	43			
90	611	330	193	121	79	54	38	28	
100	754	408	239	149	98	67	47	34	26
110	913	493	289	180	118	81	57	42	31
120	1086	587	344	215	141	96	68	49	37
130		689	404	252	165	113	80	58	43
140		780	468	292	192	131	93	67	50
150		917	537	336	220	150	106	77	57
160		1044	611	382	251	171	121	88	65
180			774	483	317	217	153	111	83
200			955	597	391	267	189	137	102
220			1156	722	474	323	228	166	123
240			1375	859	564	385	272	197	147
260			1614	1008	661	452	319	232	172
280			1872	1169	767	524	370	269	200
300			2150	1342	881	601	425	308	229
320				1527	1002	684	483	351	261
340				1724	1131	772	545	396	294
360					1268	866	611	444	330
380					1410	965	681	495	368
400					1560	1069	755	548	408
450							955	694	516
500							1179	857	637

FORMULA USED: $P = \frac{G^2 D}{12{,}031 A^2 C^2}$

WHERE FORMULA APPLIES:
P = Pressure drop (PSI) across rock bit nozzle
G = Volume of circulated fluid (GPM)
D = Fluid density (pounds per gallon)
A = Nozzle area in square inches
C = The coefficient of the orifice

NOTE: FOR OTHER MUD WEIGHTS
Multiply the pressure drop (from chart) by
a correlation factor (C.F.)
where C.F. = $\frac{\text{Mudweight}}{10}$

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BRINELL HARDNESS TABLE

Brinell (3000 Kg.)					
Diam.	Number	Diam.	Number	Diam.	Number
2.00	945	3.70	269	5.40	121
2.05	899	3.75	262	5.45	118
2.10	856	3.80	255	5.50	116
2.15	817	3.85	248	5.55	114
2.20	780	3.90	241	5.60	111
2.25	745	3.95	235	5.65	109
2.30	712	4.00	229	5.70	107
2.35	682	4.05	223	5.75	105
2.40	653	4.10	217	5.80	103
2.45	627	4.15	212	5.85	101
2.50	601	4.20	207	5.90	99.2
2.55	578	4.25	201	5.95	97.3
2.60	555	4.30	197	6.00	95.5
2.65	534	4.35	192	6.05	93.7
2.70	514	4.40	187	6.10	92.0
2.75	495	4.45	183	6.15	90.3
2.80	477	4.50	179	6.20	88.7
2.85	461	4.55	174	6.25	87.1
2.90	444	4.60	170	6.30	85.5
2.95	429	4.65	167	6.35	84.0
3.00	415	4.70	163	6.40	82.5
3.05	401	4.75	159	6.45	81.0
3.10	388	4.80	156	6.50	79.6
3.15	375	4.85	152	6.55	78.2
3.20	363	4.90	149	6.60	76.8
3.25	352	4.95	146	6.65	75.4
3.30	341	5.00	143	6.70	74.1
3.35	331	5.05	140	6.75	72.8
3.40	321	5.10	137	6.80	71.6
3.45	311	5.15	134	6.85	70.4
3.50	302	5.20	131	6.90	69.1
3.55	293	5.25	126	6.95	68.0
3.60	285	5.30	128	7.00	66.8
3.65	277	5.35	123		

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CONVERSION TABLE FOR HARDNESS TESTING

(Approximate Values)

Rockwell		Brinell	Sclero-	Rockwell		Brinell	Sclero-
"C"	"B"	No.	scope	"C"	"B"	No.	scope
66			93	33		311	46
65		745	91	32		302	45
64		712	87	31		293	43
62		682	84	30		285	42
60		653	81	29		277	41
59		627	79	28		269	40
58		601	77	27		262	39
57		578	75	25		255	38
55		555	73	24		248	37
54		534	71	23	100	241	36
52		514	70	22	99	235	35
51		495	68	21	98	229	34
50		477	66	19	97	223	34
49		461	65	18	96	217	33
47		444	63	16	96	212	33
46		429	61	15	95	207	32
45		415	59	14	94	201	31
43		401	58	13	93	197	30
42		388	56	12	92	192	29
40		375	54	10	91	187	29
39		363	52	9	90	183	28
38		352	51	8	89	179	27
37		341	50	6	88	174	27
36		331	48	5	87	170	26
34		321	47	4	86	167	26

Rockwell "C" values are determined with conical brale penetrator and 150 kilogram major load.

Rockwell "B" values are determined with .0625 in. diameter steel ball and 100 kilogram major load.

Brinell hardness values are determined with 10mm diameter steel ball and 3000 kilogram pressure.

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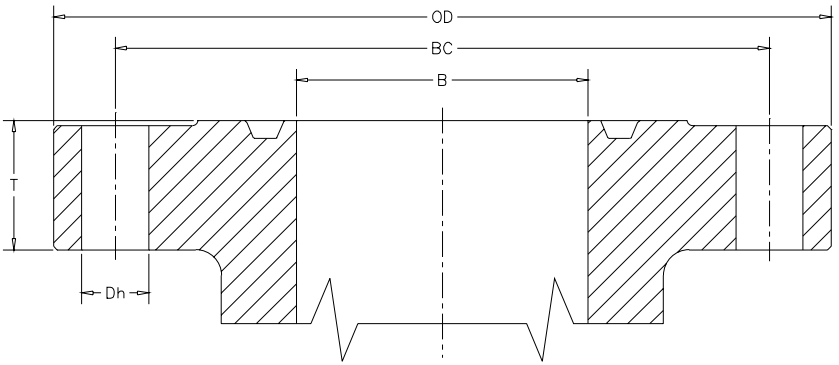
A.P.I. FLANGES DIMENSIONAL DATA



Pressure Rating	Nominal Flange size	Max. Bore "B"	O.D. Flange "OD"	Total Thk. of Flange "T"	Dia. Of Bolt Circle "BC"	# of Bolts	Dia. Of Bolts	Dia. of Bolt Holes "Dh"	Length of stud Bolts	Ring Gasket #
	in mm	**in** mm	**in** mm	**in** mm	**in** mm		**in.**	**in** mm	**in** mm	
2,000 psi (13.8 MPa) Rated Working Pressure	2 1/16 **52**	2.09 **53.2**	6.50 **165**	1.31 **33.3**	5.00 **127.0**	8	5/8	0.75 **20**	4.50 **110**	R23
	2 9/16 **65**	2.59 **65.9**	7.50 **190**	1.44 **36.5**	5.88 **149.2**	8	3/4	0.88 **22**	5.00 **120**	R26
	3 1/8 **78**	3.22 **81.8**	8.25 **210**	1.56 **39.7**	6.62 **168.5**	8	3/4	0.88 **22**	5.25 **130**	R31
	4 1/16 **103**	4.28 **108.7**	10.75 **275**	1.81 **46.0**	8.50 **215.9**	8	7/8	1.00 **26**	6.00 **150**	R37
	5 1/8 **130**	5.16 **131.0**	13.00 **330**	2.06 **52.4**	10.50 **266.7**	8	1	1.12 **30**	6.75 **165**	R41
	7 1/16 **178**	7.16 **181.8**	14.00 **355**	2.19 **55.6**	11.50 **292.1**	12	1	1.12 **30**	7.00 **175**	R45
	9 **228**	9.03 **229.4**	16.50 **420**	2.50 **63.5**	13.75 **349.2**	12	1 1/8	1.25 **33**	8.00 **205**	R49
	11 **279**	11.03 **280.2**	20.00 **510**	2.81 **71.4**	17.00 **431.8**	16	1 1/4	1.38 **36**	8.75 **220**	R53
	13 5/8 **346**	13.66 **346.9**	22.00 **560**	2.94 **74.6**	19.25 **489.0**	20	1 1/4	1.38 **36**	9.00 **230**	R57
	16 3/4 **425**	16.78 **426.2**	27.00 **685**	3.31 **84.1**	23.75 **603.2**	20	1 1/2	1.62 **42**	10.25 **260**	R65
	21 1/4 **540**	21.28 **540.5**	32.00 **815**	3.88 **98.4**	28.50 **723.9**	24	1 5/8	1.75 **45**	11.75 **290**	R73
	26 3/4 **679**	26.78 **680.2**	41.00 **1041.4**	4.97 **126.2**	37.50 **952.5**	20	1 3/4	1.88 **47.75**	13.75 **349.25**	BX167
	30 **762**	30.03 **762.8**	44.19 **1122.4**	5.28 **134.1**	40.94 **1039.9**	32	1 5/8	1.75 **44.45**	14.25 **361.95**	BX303

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A.P.I. FLANGES DIMENSIONAL DATA

Pressure Rating	Nominal Flange size	Max. Bore "B"	O.D. Flange "OD"	Total Thk. of Flange "T"	Dia. Of Bolt Circle "BC"	# of Bolts	Dia. Of Bolts	Dia. of Bolt Holes "Dh"	Length of stud Bolts	Ring Gasket #
	in mm	**in** mm	**in** mm	**in** mm	**in** mm		**in.**	**in** mm	**in** mm	
3,000 psi (20.7 MPa) Rated Working Pressure	2 1/16 **52**	2.09 **53.2**	8.50 **215**	1.81 **46.1**	6.50 **165.1**	8	7/8	1.00 **26**	6.00 **150**	R24
	2 9/16 **65**	2.59 **65.9**	9.62 **245**	1.94 **49.2**	7.50 **190.5**	8	1	1.12 **28**	6.50 **165**	R27
	3 1/8 **78**	3.22 **81.8**	9.50 **240**	1.81 **46.1**	7.50 **190.5**	8	7/8	1.00 **26**	6.00 **150**	R31
	4 1/16 **103**	4.28 **108.7**	11.50 **295**	2.06 **52.4**	9.25 **235.0**	8	1 1/8	1.25 **32**	7.00 **180**	R37
	5 1/8 **130**	5.16 **131.0**	13.75 **350**	2.31 **58.8**	11.00 **279.4**	8	1 1/4	1.38 **35**	7.75 **195**	R41
	7 1/16 **179**	7.16 **181.8**	15.00 **380**	2.50 **63.5**	12.50 **317.5**	12	1 1/8	1.25 **32**	8.00 **200**	R45
	9 **228**	9.03 **229.4**	18.50 **470**	2.81 **71.4**	15.50 **393.7**	12	1 3/8	1.50 **39**	9.00 **230**	R49
	11 **279**	11.03 **280.2**	21.50 **545**	3.06 **77.8**	18.50 **469.9**	16	1 3/8	1.50 **39**	9.50 **240**	R53
	13 5/8 **346**	13.66 **346.9**	24.00 **610**	3.44 **87.3**	21.00 **533.4**	20	1 3/8	1.50 **39**	10.25 **260**	R57
	16 3/4 **425**	16.78 **426.2**	27.75 **705**	3.94 **100.0**	24.25 **614.7**	20	1 5/8	1.75 **45**	11.75 **300**	R66
	20 3/4 **527**	20.78 **527.8**	33.75 **855**	4.75 **120.7**	29.50 **749.3**	20	2	2.12 **54**	14.50 **370**	R74
	26 3/4 **679**	26.78 **680.2**	43.38 **1101.9**	6.34 **161.0**	39.38 **1000.3**	24	2	2.12 **53.85**	17.00 **431.8**	BX168
	30 **762**	30.03 **762.8**	46.68 **1185.7**	6.58 **167.1**	42.94 **1090.7**	32	1 7/8	2.00 **50.8**	17.75 **450.85**	BX303
5,000 psi (34.5 MPa) Rated Working Pressure	2 1/16 **52**	2.09 **53.2**	8.50 **215**	1.81 **46.1**	6.50 **165.1**	8	7/8	1.00 **26**	6.00 **155**	R24
	2 9/16 **65**	2.59 **65.9**	9.62 **245**	1.94 **49.3**	7.50 **190.5**	8	1	1.12 **30**	6.50 **165**	R27
	3 1/8 **78**	3.22 **81.8**	10.50 **270**	2.19 **55.6**	8.00 **203.2**	8	1 1/8	1.25 **33**	7.25 **185**	R35
	4 1/16 **103**	4.28 **108.7**	12.25 **310**	2.44 **62.0**	9.50 **241.3**	8	1 1/4	1.38 **36**	8.00 **205**	R39
	5 1/8 **130**	5.16 **131.0**	14.75 **375**	3.19 **81.0**	11.50 **292.1**	8	1 1/2	1.62 **42**	10.00 **255**	R44
	7 1/16 **178**	7.16 **181.8**	15.50 **395**	3.62 **92.1**	12.50 **317.5**	12	1 3/8	1.50 **39**	10.75 **270**	R46
	9 **228**	9.03 **229.4**	19.00 **485**	4.06 **103.2**	15.50 **393.7**	12	1 5/8	1.75 **45**	12.00 **305**	R50
	11 **279**	11.03 **280.2**	23.00 **585**	4.69 **119.1**	19.00 **482.6**	12	1 7/8	2.00 **52**	13.75 **350**	R54

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A.P.I. FLANGES DIMENSIONAL DATA

Pressure Rating	Nominal Flange size	Max. Bore "B"	O.D. Flange "OD"	Total Thk. of Flange "T"	Dia. Of Bolt Circle "BC"	# of Bolts	Dia. Of Bolts	Dia. of Bolt Holes "Dh"	Length of stud Bolts	Ring Gasket #
	in mm	**in** mm	**in** mm	**in** mm	**in** mm		**in.**	**in** mm	**in** mm	
5,000 psi (34.5 MPa) Rated Working Pressure	13 3/8 **340**	13.66 **347.0**	26.50 **673.1**	4.44 **112.8**	23.25 **590.6**	16	1 5/8	1.75 **44.45**	12.50 **317.5**	BX160
	16 3/4 **425**	16.78 **426.2**	30.38 **771.65**	5.13 **130.3**	26.62 **676.1**	16	1 7/8	2.00 **50.8**	14.50 **368.3**	BX162
	18 3/4 **476**	18.78 **477.0**	35.62 **904.75**	6.53 **165.9**	31.62 **803.1**	20	2	2.12 **53.85**	17.50 **444.5**	BX163
	21 1/4 **540**	21.28 **540.5**	39.00 **990.6**	7.12 **180.8**	34.88 **886.0**	24	2	2.12 **53.85**	18.75 **476.25**	BX165
10,000 psi (69.0 MPa) Rated Working Pressure	1 13/16 **46**	1.84 **46.7**	7.38 **187.45**	1.66 **42.2**	5.75 **146.1**	8	3/4	0.88 **22.35**	5.00 **127**	BX151
	2 1/16 **52**	2.09 **53.1**	7.88 **200.15**	1.73 **43.9**	6.25 **158.8**	8	3/4	0.88 **22.35**	5.20 **132.08**	BX152
	2 9/16 **65**	2.59 **65.8**	9.12 **231.65**	2.02 **51.3**	7.25 **184.2**	8	7/8	1.00 **25.4**	6.00 **152.4**	BX153
	3 1/16 **78**	3.09 **78.5**	10.62 **269.75**	2.30 **58.4**	8.50 **215.9**	8	1	1.12 **28.45**	6.75 **171.45**	BX154
	4 1/16 **103**	4.09 **103.9**	12.44 **315.98**	2.77 **70.4**	10.19 **258.8**	8	1 1/8	1.25 **31.75**	8.00 **203.2**	BX155
	5 1/8 **130**	5.16 **131.1**	14.06 **357.12**	3.12 **79.2**	11.81 **300.0**	12	1 1/8	1.25 **31.75**	8.75 **222.25**	BX169
	7 1/16 **179**	7.09 **180.1**	18.88 **479.55**	4.06 **103.1**	15.88 **403.4**	12	1 1/2	1.62 **41.15**	11.25 **285.75**	BX156
	9 **229**	9.03 **229.4**	21.75 **552.45**	4.88 **124.0**	18.75 **476.3**	16	1 1/2	1.62 **41.15**	13.00 **330.2**	BX157
	11 **279**	11.03 **280.2**	25.75 **654.05**	5.56 **141.2**	22.25 **565.2**	16	1 3/4	1.88 **47.75**	15.00 **381**	BX158
	13 5/8 **346**	13.66 **347.0**	30.25 **768.35**	6.62 **168.1**	26.50 **673.1**	20	1 7/8	2.00 **50.8**	17.25 **438.15**	BX159
	16 3/4 **425**	16.78 **426.2**	34.31 **871.47**	6.62 **168.1**	30.56 **776.2**	24	1 7/8	2.00 **50.8**	17.50 **444.5**	BX162
	18 3/4 **476**	18.78 **477.0**	40.94 **1039.9**	8.78 **223.0**	36.44 **925.6**	24	2 1/4	2.38 **60.45**	22.50 **571.5**	BX164
	21 1/4 **540**	21.58 **548.1**	45.00 **1143**	9.50 **241.3**	40.25 **1022.4**	24	2 1/2	2.62 **66.55**	24.50 **622.3**	BX166

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A.P.I. FLANGES DIMENSIONAL DATA

Pressure Rating	Nominal Flange size	Max. Bore "B"	O.D. Flange "OD"	Total Thk. of Flange "T"	Dia. Of Bolt Circle "BC"	# of Bolts	Dia. Of Bolts	Dia. of Bolt Holes "Dh"	Length of stud Bolts	Ring Gasket #
	in mm	**in** mm	**in** mm	**in** mm	**in** mm		**in.**	**in** mm	**in** mm	
15,000 psi (103.5 MPa) Rated Working Pressure	1 13/16 **46**	1.84 **46.7**	8.19 **208.03**	1.78 **45.2**	6.31 **160.3**	8	7/8	1.00 **25.4**	5.50 **139.7**	BX151
	2 1/16 **52**	2.09 **53.1**	8.75 **222.25**	2.00 **50.8**	6.88 **174.8**	8	7/8	1.00 **25.4**	6.00 **152.4**	BX152
	2 9/16 **65**	2.59 **65.8**	10.00 **254**	2.25 **57.2**	7.88 **200.2**	8	1	1.12 **28.45**	6.75 **171.45**	BX153
	3 1/16 **78**	3.09 **78.5**	11.31 **287.27**	2.53 **64.3**	9.06 **230.1**	8	1 1/8	1.25 **31.75**	7.50 **190.5**	BX154
	4 1/16 **103**	4.09 **103.9**	14.19 **360.43**	3.09 **78.5**	11.44 **290.6**	8	1 3/8	1.50 **38.1**	9.25 **234.95**	BX155
	7 1/16 **179**	7.09 **180.1**	19.88 **504.95**	4.69 **119.1**	16.88 **428.8**	16	1 1/2	1.62 **41.15**	12.75 **323.85**	BX156
	9 **229**	9.03 **229.4**	25.50 **647.7**	5.75 **146.1**	21.75 **552.5**	16	1 7/8	2.00 **50.8**	15.75 **400.05**	BX157
	11 **279**	11.03 **280.2**	32.00 **812.8**	7.38 **187.5**	28.00 **711.2**	20	2	2.12 **53.85**	19.25 **488.95**	BX158
	13 5/8 **346**	13.66 **347.0**	34.88 **885.95**	8.06 **204.7**	30.38 **771.7**	20	2 1/4	2.38 **60.45**	21.25 **539.75**	BX159
	18 3/4 **476**	18.78 **477.0**	45.75 **1162.1**	10.06 **255.5**	40.00 **1016.0**	20	3	3.12 **79.25**	26.75 **679.45**	BX164
20,000 psi (138.0 MPa) Rated Working Pressure	1 13/16 **46**	1.84 **46.7**	10.12 **257.05**	2.50 **63.5**	8.00 **203.2**	8	1	1.12 **28.45**	7.50 **190.5**	BX151
	2 1/16 **52**	2.09 **53.1**	11.31 **287.27**	2.81 **71.4**	9.06 **230.1**	8	1 1/8	1.25 **31.75**	8.25 **209.55**	BX152
	2 9/16 **65**	2.59 **65.8**	12.81 **325.37**	3.12 **79.2**	10.31 **261.9**	8	1 1/4	1.38 **35.05**	9.25 **234.95**	BX153
	3 1/16 **78**	3.09 **78.5**	14.06 **357.12**	3.38 **85.9**	11.31 **287.3**	8	1 3/8	1.50 **38.1**	10.00 **254**	BX154
	4 1/16 **103**	4.09 **103.9**	17.56 **446.02**	4.19 **106.4**	14.06 **357.1**	8	1 3/4	1.88 **47.75**	12.25 **311.15**	BX155
	7 1/16 **179**	7.09 **180.1**	25.81 **655.57**	6.50 **165.1**	21.81 **554.0**	16	2	2.12 **53.85**	17.50 **444.5**	BX156
	9 **229**	9.03 **229.4**	31.69 **804.93**	8.06 **204.7**	27.00 **685.8**	16	2 1/2	2.62 **66.55**	22.38 **568.45**	BX157
	11 **279**	11.03 **280.2**	34.75 **882.65**	8.81 **223.8**	29.50 **749.3**	16	2 3/4	2.88 **73.15**	23.75 **603.25**	BX158
	13 5/8 **346**	13.66 **347.0**	45.75 **1162.1**	11.50 **292.1**	40.00 **1016.0**	20	3	3.12 **79.25**	30.00 **762**	BX159

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MANUAL TONG
TORQUE IN FOOT POUNDS

Line Pull (lbs)	2.50' (30") Tong	2.75' (33") Tong	3' (36") Tong	3.25' (39") Tong	3.50' (42") Tong	3.75' (45") Tong	4' (48") Tong	4.50' (54") Tong
500	1250	1375	1500	1625	1750	1875	2000	2250
1000	2500	2750	3000	3250	3500	3750	4000	4500
1500	3750	4125	4500	4875	5250	5625	6000	6750
2000	5000	5500	6000	6500	7000	7500	8000	9000
2500	6250	6875	7500	8125	8750	9375	10000	11250
3000	7500	8250	9000	9750	10500	11250	12000	13500
3500	8750	9625	10500	11375	12250	13125	14000	15750
4000	10000	11000	12000	13000	14000	15000	16000	18000
4500	11250	12375	13500	14625	15750	16875	18000	20250
5000	12500	13750	15000	16250	17500	18750	20000	22500
5500	13750	15125	16500	17875	19250	20625	22000	24750
6000	15000	16500	18000	19500	21000	22500	24000	27000
6500	16250	17875	19500	21125	22750	24375	26000	29250
7000	17500	19250	21000	22750	24500	26250	28000	31500
7500	18750	20625	22500	24375	26250	28125	30000	33750
8000	20000	22000	24000	26000	28000	30000	32000	36000
8500	21250	23375	25500	27625	29750	31875	34000	38250
9000	22500	24750	27000	29250	31500	33750	36000	40500
9500	23750	26125	28500	30875	33250	35625	38000	42750
10000	25000	27500	30000	32500	35000	37500	40000	45000
10500	26250	28875	31500	34125	36750	39375	42000	47250
11000	27500	30250	33000	35750	38500	41250	44000	49500
11500	28750	31625	34500	37375	40250	43125	46000	51750
12000	30000	33000	36000	39000	42000	45000	48000	54000
12500	31250	34375	37500	40625	43750	46875	50000	56250
13000	32500	35750	39000	42250	45500	48750	52000	58500
13500	33750	37125	40500	43875	47250	50625	54000	60750
14000	35000	38500	42000	45500	49000	52500	56000	63000
14500	36250	39875	43500	47125	50750	54375	58000	65250
15000	37500	41250	45000	48750	52500	56250	60000	67500

Line Pull (lbs.) — Tong Length in Feet — Torque in foot-pounds

EXAMPLE: 4000# line pull with 42' tongs will give 14,000 foot-pounds of torque.

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DIMENSIONAL DATA

LINE PIPE - STANDARD WEIGHT, THREADED - DIMENSIONAL DATA

Reprinted from API Spec 5L, March 1978

Nom. Size	O.D.	I.D.	Weight Per Foot		Thds Per In.	Taper Per Ft.	Male Thd Length	Coup-ling Length	Coup-ling Dia.
			Plain	Thd. & Cpl.					
1/8	.405	.269	.24	.25	27	3/4	.392	1-1/16	.563
1/4	.540	.364	.42	.43	18	3/4	.595	1-5/8	.719
3/8	.675	.493	.57	57	18	3/4	.601	1-5/8	.875
1/2	.840	.622	.85	.86	14	3/4	.782	2-1/8	1.063
3/4	1.050	.824	1.13	1.14	14	3/4	.794	2-1/8	1.313
1	1.315	1.049	1.68	1.70	11-1/2	3/4	.985	2-5/8	1.576
1-1/4	1.660	1.380	2.27	2.30	11-1/2	3/4	1.009	2-3/4	2.054
1-1/2	1.900	1.610	2.72	2.75	11-1/2	3/4	1.025	2-3/4	2.200
2	2.375	2.067	3.65	3.75	11-1/2	3/4	1.058	2-7/8	2.875
2-1/2	2.875	2.469	5.79	5.90	8	3/4	1.571	4-1/8	3.375
3	3.500	3.068	7.58	7.70	8	3/4	1.634	4-1/4	4.000
3-1/2	4.000	3.548	9.11	9.25	8	3/4	1.684	4-3/8	4.625
4	4.500	4.026	10.79	11.00	8	3/4	1.734	4-1/2	5.200
5	5.563	5.047	14.62	15.00	8	3/4	1.840	4-5/8	6.296
6	6.625	6.065	18.97	19.45	8	3/4	1.946	4-7/8	7.390
8	8.625	7.981	28.55	29.35	8	3/4	2.146	5-1/4	9.625
8	8.625	8.071	24.70	25.55	8	3/4	2.146	5-1/4	9.625
10	10.750	10.020	40.48	41.85	8	3/4	2.359	5-3/4	11.750
10	10.750	10.192	31.20	32.75	8	3/4	2.359	5-3/4	11.750
10	10.750	10.136	34.24	35.75	8	3/4	2.359	5-3/4	11.750
12	12.750	12.000	49.56	51.15	8	3/4	2.559	6-1/8	14.000
12	12.750	12.090	43.77	45.45	8	3/4	2.559	6-1/8	14.000
14	14.000	13.250	54.57	57.00	8	3/4	2.684	6-3/8	15.000
16	16.000	15.250	62.58	65.30	8	3/4	2.884	6-3/4	17.000
18	18.000	17.250	70.59	73.00	8	3/4	3.084	7-1/8	19.000
20	20.000	19.250	78.60	81.00	8	3/4	3.284	7-5/8	21.000

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DIMENSIONAL DATA
STANDARD STEEL PIPE
DIMENSION AND STRENGTH DATA

Nom. Size	O.D. (Inches)	Standard - Weight				Extra-Strong				Double-Extra-Strong			
		I.D. (Inches)	Wall Thickness (Inches)	Wt./Ft. Plain	Grade A Test Pressure	I.D. (Inches)	Wall Thickness (Inches)	Wt./Ft. Plain	Grade A Test Pressure	I.D. (Inches)	Wall Thickness (Inches)	Wt./Ft. Plain	Grade A Test Pressure
1/8	0.405	0.269	0.068	.24	700	0.215	0.095	0.31	850				
1/4	0.540	0.364	0.088	.42	700	0.302	0.119	0.54	850				
3/8	0.675	0.493	0.091	.57	700	0.423	0.126	0.74	850				
1/2	0.840	0.622	0.109	.85	700	0.546	0.147	1.09	850	0.252	0.294	1.71	1000
3/4	1.050	0.824	0.113	1.13	700	0.742	0.154	1.47	850	0.434	0.308	2.44	1000
1	1.315	1.049	0.133	1.68	700	0.957	0.179	2.17	850	0.599	0.358	3.66	1000
1-1/4	1.660	1.380	0.140	2.27	1200	1.278	0.191	3.00	1800	0.896	0.387	5.21	2200
1-1/2	1.900	1.610	0.145	2.72	1200	1.500	0.200	3.63	1800	1.100	0.400	6.41	2200
2	2.375	2.067	0.154	3.65	2330	1.939	0.218	5.02	2500	1.503	0.436	9.03	2500
2-1/2	2.875	2.469	0.203	5.79	2500	2.323	0.276	7.66	2500	1.771	0.552	13.70	2500
3	3.500	3.068	0.216	7.58	2220	2.900	0.300	10.25	2500	2.300	0.600	18.58	2500
3-1/2	4.000	3.548	0.226	9.11	2030	3.364	0.318	12.51	2800				
4	4.500	4.026	0.237	10.79	1900	3.826	0.337	14.98	2700	3.152	0.674	27.54	2800
5	5.563					4.813	0.375	20.78	2430	4.063	0.750	38.55	2800
6	6.625					5.761	0.432	28.57	2350	4.897	0.864	53.16	2800
8	8.625					7.625	0.500	43.39	2090	6.875	0.875	72.42	2800
10	10.750					9.750	0.500	54.74	1670				
12	12.750					11.750	0.500	65.42	1410				

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A.P.I. STANDARD THREADED LINE PIPE
DIMENSIONS AND TEST PRESSURES
Dimensions in inches at 68°F.

Size O.D.	Weight per foot		Pipe			Threads per inch	Couplings			Test prssure			
	Threads and coup-lings	Plain ends	Thick-ness	Diameters			Length	Exter-nal dia.	Weight	Butt-welded	Lap-welded or Grade A seam-less	Grade B seam-less	Grade C seam-less
				Exter-nal	Inter-nal								
Ins.	Lbs.	Lbs.	Ins.	Ins.	Ins.		Ins.	Ins.	Lbs.	Lbs./sq. in.			
1/8	.25	.24		.405	.269	27	1-1/16	.563	.04	700	700	700	700
1/4	.43	.42		.540	.364	18	1-5/8	.719	.09	700	700	700	700
3/8	.57	.57		.675	.493	18	1-5/8	.875	.13	700	700	700	700
1/2	.86	.85		.840	.622	14	2-1/8	1.063	.23	700	700	700	700
1/4	1.14	1.13		1.050	.824	14	2-1/8	1.313	.33	700	700	700	700
1	1.70	1.68		1.315	1.049	11-1/2	2-5/8	1.576	.52	700	700	700	700
1-1/4	2.30	2.27		1.660	1.380	11-1/2	2-3/4	2.054	1.01	800	1000	1100	1300
1-1/2	2.75	2.72		1.900	1.610	11-1/2	2-3/4	2.200	.88	800	1000	1100	1300
2	3.75	3.65		2.375	2.067	11-1/2	3-1/4	2.875	2.11	800	1000	1100	1300
2-1/2	5.90	5.79		2.875	2.469	8	4-1/8	3.375	3.28	800	1000	1100	1300
3	7.70	7.58		3.500	3.068	8	4-1/4	4.000	4.00	800	1000	1100	1300
3-1/2	9.25	9.11		4.000	3.548	8	4-3/8	4.625	5.91	1200	1200	1300	1600
4	11.00	10.79		4.500	4.026	8	4-1/2	5.200	7.60	1200	1200	1300	1600
5	15.00	14.62		5.563	5.047	8	4-5/8	6.290	10.00		1200	1300	1600
6	19.45	18.97		6.625	6.065	8	4-7/8	7.300	13.04		1200	1300	1600
8	25.55	24.70		8.625	8.071	8	5-1/4	9.625	23.46		1200	1300	1600
8	29.35	28.55		8.625	7.981	8	5-1/4	9.625	23.46		1200	1300	1600
10	32.75	31.20		10.750	10.192	8	5-3/4	11.750	32.02		1000	1200	1400
10	35.75	34.24		10.750	10.136	8	5-3/4	11.750	32.02		1000	1200	1400
10	41.85	40.48		10.750	10.020	8	5-3/4	11.750	32.02		1000	1200	1400
12	45.45	43.77		12.750	12.090	8	6-1/8	14.000	49.92		1000	1200	1400
12	51.15	49.56		12.750	12.000	8	6-1/8	14.000	49.92		1000	1200	1400
14	57.00	54.57		14.000	13.250	8	6-3/8	15.000	46.31		950	1100	1400
16	65.30	62.58		16.000	15.250	8	6-3/4	17.000	56.18		850	1000	1300
18	84.00	76.84		18.000	17.182	8	7-1/8	19.000	66.93		900	1000	1300
20	94.00	85.58		20.000	19.182	8	7-5/8	21.000	80.00		800	900	1200

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RECOMMENDATIONS FOR TOOLS VERSUS CASING AND HOLE SIZE

Casing Or Hole Size	Overshot		Washpipe		Tools		Drill Collar
(In Inches)	O.D.	Max. Catch	O.D.	I.D.	O.D.	Conn.	O.D.
4-1/2 Casing	3-7/8	3-1/8	3-3/4	3-1/4	3-1/8	2-3/8	3-1/8
5 Casing	4-1/8	3-1/8	4	3-3/8	3-1/8	2-3/8	3-1/8
5-1/2 Casing thru 17#	4-11/16	3-3/4	4-1/2	3-13/16	3-3/4	2-7/8	3-1/2
5-1/2 Casing thru 23#	4-1/2	3-21/32	4-1/2	3-13/16	3-3/4	2-7/8	3-1/2
7 Casing thru 26#	5-3/4	4-3/4	5-3/4	5	4-3/4	3-1/2 F.H.	4-3/4
7 Casing thru 38#	5-1/2	4-5/8	5-1/2	4-7/8	4-1/2	2-7/8 I.F.	4-1/2
7-5/8 Casing/ 6-3/4 Hole	6-3/8	5-1/4	6-3/8	5-5/8	4-3/4	3-1/2 F.H.	4-3/4
8-5/8 Casing/ 7-7/8 Hole	7-5/8	6-1/2	7-5/8	6-7/8	6-1/4	4-1/2 F.H.	6-1/2
7-5/8 Hole	7-3/8	6-1/4	7-3/8	6-5/8	6	4-1/2 F.H.	6-1/4
9-5/8 Casing/ 8-3/4 Hole	8-3/8	7	8-3/8	7-5/8	6-3/4	5-1/2 Reg.	7
9-5/8 Casing/ 8-1/2 Hole	8-1/8	7	8-1/8	7-1/4	6-3/4	5-1/2 Reg.	6-3/4
10-3/4 Casing/ 9-7/8 Hole	9-5/8	8	9-3/8	8-1/2	7-3/4	6-5/8 Reg.	8
10-3/4 Casing/9-5/8 Hole	9-1/8	8	9-3/8	8-1/2	7-3/4	6-5/8 Reg.	8
13-3/8 Casing/ 12-1/4 Hole	11-3/4	10-1/8	11-3/4	10-3/4	7-3/4	6-5/8 Reg.	9 - 10
15 Hole	12-3/4	11-1/4	13-3/8	12-3/8	7-3/4	6-5/8 Reg.	11
17-1/2 and larger	16-3/4	14-3/4	16	15	7-3/4	6-5/8 Reg.	11 - 14

NOTES: Overshot and washover pipe O.D. shown are the largest that can be run. Tool and drill collar O.D.'s are the largest that can be fished externally. Whenever possible, maintain 3/8'' between washover pipe O.D. and hole size and 1/4'' washover pipe I.D. and fish O.D.

Cased hole fishing requires special attention to weight per foot of casing.

There are available within the company some super slim-hole overshots. These should be considered for pick-out jobs only where no jarring or torquing is required. The location and availability of these can be best located by Technical Managers and/or District Managers.

Remember, these tools are the maximum size that CAN be run. They are not always the preferred or the available size.

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FORMULAS USED IN WELL CONTROL AND DRILLING OPERATIONS

A. CALCULATING PRESSURE, PSI AND PRESSURE GRADIENTS, PSI/FT.

1. **Determine pressure gradient**, psi/ft.
   (Mud Weight, ppg.) x (.052) = psi/ft.
2. **Determine hydrostatic pressure**, psi (H.P.)
   (Mud Wt., ppg.) x (.052) x (T.V.D., ft.) = psi
3. **Maximum allowable shut-in casing pressure**
   (Maximum Allowable Mud Wt, ppg.) — (Mud Wt. in use, ppg.) x (.052) x (TVD, ft.) = psi

B. **CONVERTING PRESSURES**, PSI **INTO MUD WEIGHT**, PPG.

(**NOTE:** Anytime a pressure is to be converted to mud weight, the following formula is used.)

All of the following use the same formula:

$$\frac{\text{Pressure, psi}}{.052 \times \text{T.V.D., ft.}} = \text{Mud Weight, ppg}$$

Using the calculator, this formula is worked as follows:
(Pressure, psi) ÷ (.052) ÷ (T.V.D., ft.) = Mud Weight, ppg.

1. **Kill Weight Mud, ppg.**
   (SIDPP, psi) ÷ (.052) ÷ (T.V.D., ft.) + (O.M.W.) = Kill Wt., ppg.

2. **Equivalent Mud Wt., ppg.** (E.M.W.)
   (Pressure, psi) ÷ (.052) ÷ (T.V.D., ft.) = E.M.W. ppg.

3. **Equivalent Circulating Density, ppg,** (E.C.D.)
   (Annular Pressure Loss, psi) ÷ (.052) ÷ (T.V.D., ft.) + (O.M.W.) = E.C.D., ppg.

4. **Maximum Allowable Mud Weight,** ppg.
   (Leak-off Pressure psi) ÷ (.052) ÷ (T.V.D., ft.) + (Test Mud Weight) = ppg.

5. **Converting Pressure Gradient,** psi/ft **to Mud Wt.,** ppg.
   (Pressure Gradient, psi/ft.) ÷ (.052) = Mud Wt., ppg.

C. **MISCELLANEOUS FORMULAS:**

1. **Determine the output of a Triplex Pump,** bbls/stk
   (.000243) x (Diameter, in.)^2 x (Length, in.) = Pump Output @100% Efficiency

2. **Annular Velocity,** ft./min.
   (Pump Output, bbls./min.) ÷ (Annular Volume, bbls./ft.) = FT/min.

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3. Determine Annular Volume, BBLS./ft.

(Hole Diameter, in)^2 - (Pipe O.D., in.)^2 ÷ (1029) = BBLS./FT.

4. Pump Pressure/Pump Strokes Relationship
(This formula is used to determine the new pump pressure if the STROKE RATE is changed.)

$$\text{(Present Pump Pressure, psi)} \times \left[\frac{\text{New SPM}}{\text{Old SPM}}\right]^2 = \text{New Pump Pressure, psi}$$

5. **Formula to determine the cubic feet (ft.^{3}) of cuttings drilled for each foot of hole drilled.**

$$\left(\frac{Dh^2}{144}\right) \times .785 = ft^3 \text{ of cuttings drilled for each foot or hole drilled}$$

6. **Formula to determine the Barrels of cuttings drilled for each foot of hole drilled.**

$$\left(\frac{Dh^2}{1029}\right) = \text{BBLS. of cuttings drilled for each foot of hole drilled}$$

7. Formula for determining maximum drilling rates (MDR) when drilling large diameter holes (14-3/4'' and larger):

$$MDR = \frac{67 \times (\text{Mud Wt. OUT, ppg} - \text{Mud Wt. IN, ppg}) \times \text{Circulation Rate, GPM.}}{Dh^2} = \text{ROP, Ft./hr.}$$

8. Formula to determine the HYDROSTATIC PRESSURE DECREASE when pulling pipe:

STEP NO. 1:
BBLS. displaced=(No. of stands pulled)x(Average Length per stand)x (Pipe Displacement bbls./ft.)

STEP NO. 2:

$$\left(\frac{\text{BARRELS DISPLACED}}{\text{Casing Capacity BBSL./ft.} - \text{Pipe Displacement BBLS/ft.}}\right) \times (.052) \times (\text{mud weight ppg.}) = \text{H.P. decrease, psi}$$

9. Formula to determine drill pipe capacity, BBLS
(Drill Pipe Capacity BBLS./ft.) x (Length, ft.) = Drill Pipe Capacity, BBLS

10. Formula to determine drill collar capacity, BBLS
(Drill Collar Capacity BBLS./ft.) x (Length, ft.) = Drill Collar Capacity, BBLS

11. Formula to determine the capacity, bbls./ft. of any size pipe or cylindrical object.

$$\frac{ID.^2}{1029} = \text{BBLS/FT.}$$

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D. KICK FORMULAS:

1. Initial Drill Pipe Circulating Pressure, psi (I.D.P.P.)

(SIDPP, psi) + (Kill Rate Pressure, psi) = IDPP, psi

2. Final Drill Pipe Circulating Pressure, psi (F.D.P.P.)

(Kill Wt. Mud, ppg.) x (Kill Rate Pressure, psi) ÷ (O.M.W., ppg.) = F.D.P.P., psi.

3. **Shut-in Drill Pipe Pressure,** psi (SIDPP)

(Formation Pressure, psi) — (H.P. of mud in Drill String, psi) = SIDPP, psi

4. **Shut-in Casing Pressure,** psi (SICP)

(Formation Pressure, psi) — (H.P. in annulus H.P. of mud plus H.P. of influx) = SICP, psi

5. **Formation Pressure,** psi

(SIDPP, psi) + (H.P. of mud in drill string) = Formation Pressure, psi

6. **Height of Influx,** Ft.

(Plt gain, bbls) ÷ (Annular Volume, bbls./ft.) = Feet

7. **Gradient of Influx,** psi/ft.

$$(\text{Mud Wt., ppg.} \times .052) - \left(\frac{\text{SICP - SIDPP}}{\text{Height of influx, ft.}}\right) = \text{psi/ft.}$$

8. Formula to Determine the Interum Pressures when using a tapered string:

psi @
_____ STKS. =

$$\left[\text{SIDPP} \times \left(\frac{\text{DSL} - \text{DPL}}{\text{DSL}}\right)\right] + \left[\left[\left(\text{KRP} \times \frac{\text{KWM}}{\text{OMW}}\right) - \text{KRP}\right] \times \left(\frac{\text{DPL}}{\text{DSL}}\right)\right] + \text{KRP}$$

SIDPP - Shut-in drill pipe pressure, psi
DSL - total drill string length, ft.
DPL - Drill pipe length, ft (cumulative)
KRP - Kill Rate pressure, psi
KWM - Kill Weight mud, ppg.
OMW - Original mud weight, ppg.

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When should this calculation be used:
When using a tapered string, these should be determined:

1. Initial Drill Pipe Circulating Pressure (Use formula on the Kill Sheet).

2. The above calculation should be used where the fluid goes from large drill pipe to small drill pipe.

3. The above calculation should be used where the fluid goes from small drill pipe to the collars.

4. Final Drill Pipe Circulating Pressure (Use formula on the Kill Sheet.)

E. **CEMENT CALCULATIONS**

1. Determine the number of sacks of cement required, **IF** the number of **FEET** to be cemented is KNOWN:

STEP NO. 1:
From the Haliburton book, determine the annular space in $ft^3/ft.$ (cubic feet per linear foot), between the casing and the open hole:

SECTION ONE: "Volume and Height Between Casing and Hole"

STEP NO. 2:
Calculate the number of sacks of **FILLER** cement required:

(Feet) x (Annular Vol., $ft.^3/ft.$) x (Excess) ÷ (Yield, ft^3/sk filler cmt.) = Sacks required

STEP NO. 3:
Calculate the number of sacks of **NEAT** cement required:

(Feet) x (Annular Vol., $ft.^3/ft.$) x (Excess) ÷ (Yield, ft^3/sk NEAT cmt.) = Sacks required

STEP NO. 4:
Calculate the number of barrels in the casing that must be displaced when pumping the cement: calculate the volume down to the float collar:

From the **"CAPACITY"** section of the Haliburton book, obtain the Casing Capacity, **BBLS./FT.**

(Casing Capacity BBSL/ft.) x (Feet of casing to the float collar) = Casing Capacity, BBLS.

STEP NO. 5:
Determine the number of strokes required to bump the plug:

(Casing Capacity BBLS.) ÷ (Pump Output BBLS/STK.) = Strokes required to bump plug.

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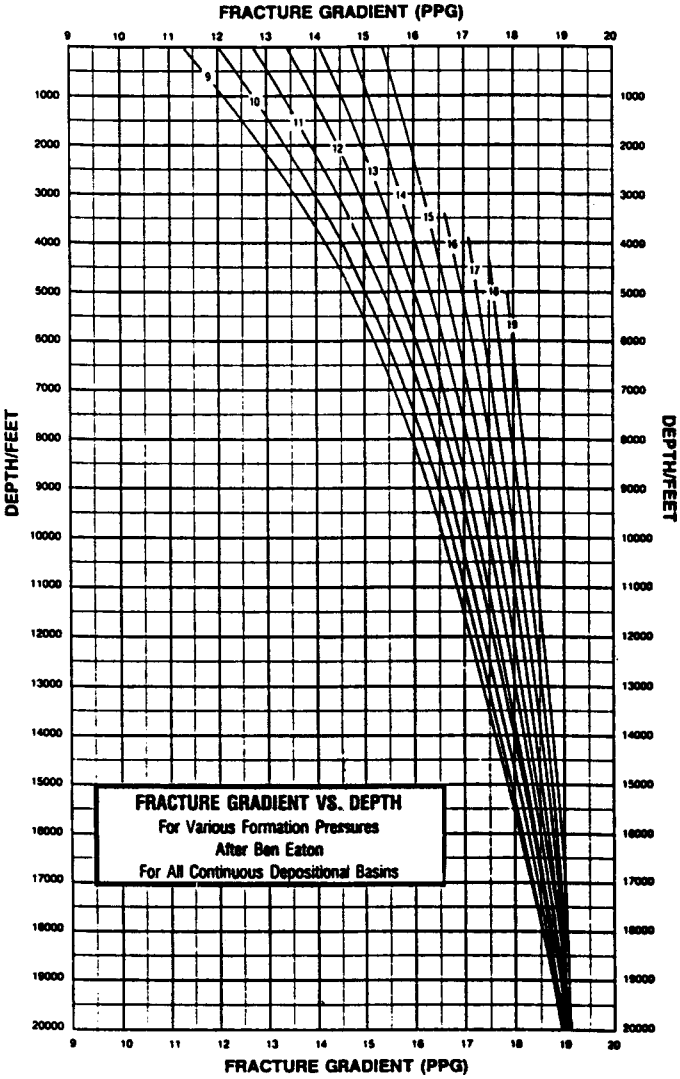

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2. Determine the number of **FEET** that will be cemented, **IF** the number of **SACKS** of cement is **KNOWN:**

STEP NO. 1:
From the Haliburton book, determine the annular space in $ft.^3$/ft. (cubic feet per linear feet), between the casing and the open hole:

SECTION ONE: "Volume and Height Between Casing and Hole"

STEP NO. 2:
Determine the volume of liquid cement (slurry, $ft.^3$)

Filler Cement:
(sacks, dry cement) x (Yield, $ft.^3$/ft. filler cmt.) = $ft.^3$ slurry, Filler cmt.

NEAT Cement:
(sacks, dry cement) x (Yield, $ft.^3$/ft. NEAT cmt.) = $ft.^3$ slurry, NEAT cmt.

STEP NO. 3:
Determine the **HEIGHT** of **NEAT** and **HEIGHT** of **FILLER** cement:

For NEAT Cement:
($Ft.^3$ of NEAT cement) ÷ (Annular space, $ft.^3$/ft.) ÷ (Excess) = Feet of NEAT cement.

For FILLER CEMENT:
($Ft.^3$ of NEAT cement) ÷ (Annular space, $ft.^3$/ft.) ÷ (Excess) = Feet of FILLER cement.

STEP NO. 4:
Determine the top of **NEAT** and top of **FILLER** cement

Top of NEAT cement = (T.D.) — (Feet of NEAT cement) = FT.

Top of FILLER cmt. = (T.D.) — (Feet of NEAT cmt.) — (Feet of FILLER cmt.) = Ft.

F. DETERMINE WEIGHT ON BIT

STEP NO. 1:
Determine the desired Weight on Bit (WOB). This is the actual WOB to be used while drilling.

STEP NO. 2:
Add on excess, usually 10 to 15%, as a safety factor. This safety factor places the neutral point in the BHA to prevent drill pipe buckling.

(Desired WOB, lbs.) x (1.10 S.F.) = WOB plus safety factor.
10%

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STEP NO. 3:

Convert WOB, plus the safety factor, to weight in air. From the Haliburton book, in the **"DISPLACEMENT"** Section, Page 9, obtain the buoyancy factor for the mud weight in use:

(WOB + S.F.) ÷ (Buoyancy factor) = Weight in air, lbs.

STEP NO. 4:

Design a BHA that will **EQUAL** or **SLIGHTLY EXCEED** this weight in air, lbs.

STEP NO. 5:

After designing a BHA, CHECK your numbers to insure the desired WOB has been achieved:

(Designed BHA, wt. in air) x (Buoyancy factor) — (Excess) = Available weight on Bit, lbs.

G. DRILL STRING LIMITATIONS

Determine the number of feet of 5'' - 19.5#/ft. Grade "E" and Grade "G" drill pipe that can be run with a specific BHA.

STEP NO. 1:

From the Haliburton book in the **"Dimensions and Strengths"** Section; determine the tensile strength of "NEW" 5'' -19.5 #/ft. Grade "E" and Grade "G" drill pipe.

Size O.D. In.	Wt. PerFt. w/Cplg. Lb.	Tensile Strength E 1000 Lb.	Tensile Strength G 1000 Lb.
5	19.5	396	554

(For "NEW" drill pipe)

STEP NO. 2:

Correct the Tensile Strength of "NEW" pipe to the Tensile strength of No. 2 pipe:

Grade "E":

(396,000#) x (.80%) = 316,800# Tensile Strength for No. 2 pipe

Grade "G"

(554,000#) x (.80%) = 443,200# Tensile Strength for No. 2 pipe

STEP NO. 3: CALCULATIONS

Determine how many feet of Grade "E" and Grade "G" drill pipe can be run in the hole.

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Grade "E"

[Tensile Strength No. 2 pipe, Lbs.] — [Desired Overpull, Lbs.] — [Wt. of BHA in Air, Lbs.] ÷ [Wt. per Ft. of 5" drill pipe] = Feet of Grade "E" pipe

Grade "G"

[Tensile Strength No. 2 pipe, Lbs.] — [Desired Overpull, Lbs.] — [Wt. of BHA in air, Lbs.] — [Wt. of Grade "E" pipe, lbs.] ÷ [Wt. per Ft.of 5" drill pipe] = Feet of Grade "G" pipe

H. DETERMINING FREE POINT

The number of feet of free pipe can be estimated by using the formula below:

DRILL PIPE STRETCH TABLE

O.D.	Nominal Weight	I.D.	Wall Area	Stretch Constant	Free Point Constant
(in.)	(lb/ft)	(in.)	(sq. in.)	(in./1000 lb./1000 ft.)	
(2-3/8)	4.85	1.995	1.304	0.30675	3260.0
	6.65	1.815	1.843	0.21704	4607.5
(2-7/8)	6.85	2.441	1.812	0.22075	4530.0
	10.40	2.151	2.858	0.13996	7145.0
(3-1/2)	9.50	2.992	2.590	0.15444	6475.0
	13.30	2.764	3.621	0.11047	9052.5
	15.50	2.602	4.304	0.09294	10760.0
(4)	11.85	3.476	3.077	0.13000	7692.5
	14.00	3.340	3.805	0.10512	9512.5
(4-1/2)	13.75	3.958	3.600	0.11111	9000.0
	16.60	3.826	4.407	0.09076	11017.5
	18.10	3.754	4.836	0.08271	12090.0
	20.00	3.640	5.498	0.07275	13745.0
(5)	16.25	4.408	4.374	0.09145	10935.0
	19.50	4.276	5.275	0.07583	13187.5
(5-1/2)	21.90	4.778	5.828	0.06863	14570.0
	24.70	4.670	6.630	0.06033	16575.0
(6-5/8)	25.20	5.965	6.526	0.06129	16315.0

$$\text{Feet of Free Pipe} = \frac{(\text{Stretch, Inches}) \times (\text{Free Point Constant})}{(\text{Pull Force, in thousands of lbs.})}$$

Example: 5'' -- 19.5#/ft. drill pipe
34'' of stretch with 40,000# Pull Force

Feet of Free Pipe = (34'') x (13187.5) ÷ 40 = 11,209 ft.

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I. TESTING THE CEMENT JOB AND THE FORMATION

1. Two (2) Methods of Testing:
   a. Testing to an equivalent mud weight.
   b. Testing to formation, leak-off.

2. Precautions to be undertaken before testing:

   a. Circulate and condition the mud to insure the mud weight is consistent throughout the system.

   b. Change the pressure guage (if possible) to a smaller increment guage ó so a more accurate measure can be determined.

   c. Shut-in the well.

   d. Begin pumping and continue pumping at a very slow rate - 1/4 to 1/2 bbl/min.

   e. Monitor pressures, time and barrels pumped.

   f. Some operators may have different procedures in running this test, others may include:

   1. Increasing the pressure by 100 psi increments, waiting for a few minutes, then increasing by another 100 psi, until...

   2. Some operators prefer not pumping against a closed system, they prefer to circulate through the choke and increasing back pressure by slowly closing the choke. In this method, the annular pressure loss must be calculated and added to the test pressure.

   3. Testing to an equivalent mud weight.

   a. This test is used primarily on development wells where the maximum mud weight that will be used to drill the interval is **KNOWN**:

   b. **PROCEDURE:**

STEP NO. 1:
Determine the equivalent test mud weight, ppg.:

[Maximum Mud Weight to be used] + [1 ppg. Safety Factor] = Equivalent Test Mud Weight, ppg.

NOTE: Some operators may use a different safety factor or a different procedure in obtaining this equivalent test mud weight.

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STEP NO. 2:

Determine the surface pressure to be used:

[Equiv. Test Mud Wt., ppg] x [.052] x [Casing Seat T.V.D., ft.] = Max. Pressure to be felt at csg. seat.

ó [Mud Wt., ppg in use] x [.052] x [Casing Seat T.V.D., ft.] = ó H.P. of mud in wellbore. / TEST PRESSURE, psi

Short Calculation:

[Equiv. Test Mud Wt., ppg.] ó [Mud Wt. in use, ppg.] x [.052] x [Casing Seat T.V.D., ft.] = Surface Pressure to be used.

4. Testing to formation leak-off:

a. This test is used primarily on wildcat wells or where the fracture pressure is **NOT KNOWN**.

b. **PROCEDURE:**

STEP NO. 1:

Determine the Estimated Fracture Gradient from the **'FRACTURE GRADIENT CHART'**

STEP NO. 2:

Determine the **Estimated Leak-Off Pressure:**

[Fracture gradient, ppg.] x [.052] x [Casing Seat T.V.D.] = Fracture Pressure, psi

ó [Mud Wt. ppg in use] x [.052] x [Casing Seat T.V.D.]= ó H.P. of mud in wellbore, psi / Estimated Leak-Off Pressure, psi

Short Calculation:

[Fracture Gradient ppg.] ó [Mud Wt. in use, ppg.] x [.052] x [Casing Seat T.V.D., ft.] = Estimated Leak-off Pressure, psi

J. GAS BUBBLE MIGRATION IN A SHUT-IN WELL

The rate of gas migration in a shut-in well can be determined by the following observations and calculations.

[Increase in Casing Pressure in one hour] [Pressure Gradient of Mud Wt. in use] = The Rate of Gas Migration per hour

Example:

Stabilized SICP = 500 psi

SICP after 1 hour = 600 psi

Mud weight in use = 12.0 ppg

Pressue gradient for 12.0 ppg = 12.0 ppg. x .052 = .624 psi/ft.

CALCULATION:

[100 psi] [.624 psi/ft] = 160.25 ft/hr.

The gas is migrating at a rate of 160.25 ft./hr.

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K. HYDROSTATIC PRESSURE DECREASE CAUSED BY GAS CUT MUD

$$100 \frac{\text{(Wt. of Uncut Mud, ppg. — Wt. of Gas Cut Mud, ppg)}}{\text{Wt. of Gas Cut Mud, ppg.}} = \text{H.P. Decrease, psi}$$

Example:

18 ppg mud gas cut to 9.0 ppg:

$$\frac{100\ (18 - 9)}{9} = 100 \text{ psi}$$

Bottom hole pressure has been reduced by 100 psi

L. DETERMINE THE DEPTH OF A WASHOUT:

If a washout is suspected, the following prodedures and calculations may be used to determine the depth of that washout:

1. Pump soft-line (or other material) down the drill pipe and notice how many strokes are required before the pump pressure increases.

2. **Calculation:**

[Strokes Required] x [Pump Output BBLS/STK] ÷ [Drill Pipe Capacity, BBLS/Ft] = Depth of Washout , ft.

Example:

Drill Pipe = 5'' — 19.5#/ft.
Capacity = .0178 bbls/ft.
Pump Output = .1429 bbls/STK.

NOTE: A pressure increase was noticed after 630 strokes.

[630 STKS.] x [.1429 BBLS/STK] ÷ [.0178 BBLS/ft.] = 5058 ft.

The washout is at a depth of 5058 ft.

M. LOST RETURNS — Fill up the annulus with water.

1. Determine the number of feet of water in annulus.

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2. Determine the hydrostatic pressure decrease at T.D.

3. Determine the equivalent mud weight at T.D.

DATA: Mud Weight = 12.5 ppg
Wt. of water = 8.33 ppg
Total depth = 10,000 ft.
Drill pipe = 5.0''
Casing I.D. = 12.515''

NOTE: Barrels of water required to fill the hole = 150 bbls.
PROCEDURE: Calculate the annular volume between casing I.D. and the drill pipe.

$$\frac{Dh^2 - Dp^2}{1029} = \text{bbls/ft} \quad \frac{12.515^2 - 5^2}{1029} = \frac{156.62 - 25}{1029} = .1279 \text{ bbls./ft.}$$

1. Determine the number of feet of water in the annulus:

(150 bbls) ÷ (.1279 bbls./ft.) = 1173 ft.

2. Determine the Hydrostatic Pressure decrease at T.D.:

[Mud Wt. in use, ppg.] — [Wt. of Water, ppg.] x [.052] x [1173 ft.] = 254 psi.

The hydrostatic pressure decrease at T.D. is 254 psi.

3. Determine the equivalent mud weight at T.D.:

[250 psi] ÷ [.052] ÷ [10,000 ft] = .48 ppg. decrease in mud weight

(12.5 ppg) — (.48 ppg.) = 12.02 ppg

The equivalent mud weight at T.D. is 12.02 ppg.

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KILL SHEET

PRE-RECORDED DATA

Original mud weight = (_____) ppg.
Measured depth = (_____) ft.
Kill rate pressure (_____) psi at (_____) SPM
Kill rate pressure (_____) psi at (_____) SPM

DRILL STRING VOLUME = (_____) bbls

a. Drill Pipe Capacity:
(_____) bbls/ft x (_____) length, ft =(_____) bbls.

b. Drill Pipe Capacity:
(_____) bbls/ft x (_____) length, ft =(_____) bbls.

c. Drill Collar Capacity:
(_____) bbls/ft x (_____) length, ft =(_____) bbls.

ANNULUS VOLUME =(_____) bbls.

a. Drill collar in open hole:
Capacity, (_____) bbls/ft x (_____) length, ft = (_____) bbls.

b. Drill pipe in open hole:
Capacity, (_____) bbls/ft x (_____) length, ft = (_____) bbls.

c. Drill pipe in casing:
Capacity, (_____) bbls/ft x (_____) length, ft =(_____) bbls.

Pump Output (_____) bbls/stk @(_____) % Efficiency

Drill String Strokes =

$$\frac{\text{Dril String Vol. (\_\_\_\_\_) bbls}}{\text{Pump Output (\_\_\_\_\_) bbls/stk}} = (\_\_\_\_\_) \text{ STKS.}$$

Max. Allowable Shut-in Casing Pressure(_____) psi

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SUBSEA CONSIDERATION

SICP(_____) — CLPL (_____) =(_____) psi

PSI/STROKE = I.D.P.P. (_____) — F.D.P.P. (_____) =(_____)psi/stk

STROKES To Bit (_____)

KICK DATA

SIDPP = (_____)psi

SICP = (_____)psi

Pit Gain = (_____bbls._____)

True Vertical Depth = (_____)ft.

CALCULATIONS

Kill Weight Mud

= SIDPP (_____) psi ÷ .052 ÷ TVD (_____) + OMW (_____) ppg = (_____)ppg

Initial Drill Pipe Pressure

= SIDPP (_____) psi + Kill Rate Pressure (_____) psi = (_____) psi

Final Drill Pipe Pressure

= Kill Wt. Mud (_____) ppg. x Kill Rate Pressure (_____) psi

Original Mud Wt. (_____) ppg.

PRESSURE CHART

STROKES	PRESSURE	
0		◁ INITIAL DRILL PIPE PRESSURE
STROKES TO BIT ▷		◁ FINAL DRILL PIPE PRESSURE

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USEFUL EQUATIONS

VOLUME AND CAPACITY:

$$BPF = \frac{(Diameter)^2}{1029.4}$$

$$Cu.\ Ft./Ft. = \frac{BPF}{0.1781}$$

One Bbl. = 42 Gallons = 5.6146 Cu. Ft.
One Cu. Ft. = 7.4805 Gals. = 0.1781 Bbls.
One Gal. Water Weighs 8.33 Lbs.
One Cu. Ft. Water Weighs 62.316 Lbs.
Annular Vol., Bbl/ft. = $.0009714 (D^2 - d^2)$
Cu. Ft./Ft. = $.005454 (D^2 - d^2)$

AREA:

Area of a circle = $0.7854(D)^2$
End Area of two circles = $(D_2^2 — D_1^2)\ 0.7854$

PRESSURE:

Pressure = 0.052 (MW, PPG) (Depth. Ft.)
Pressure = 0.00695 (MW, Lb./Cu. Ft.) (Depth. Ft.)

MAXIMUM SURGE PRESSURE:

Pg = G(x) L / 300 (Dh - Dp) [Static Conditions]
Pg = YP / 0.3 (Dh - Dp) [Dynamic Conditions]
Pg = Surge due to gels, psi/100 Ft.
YP = Yield Point, Lb./100 Sq. Ft.
Dh - Dp = Annular Clearance
G(x) = Gel Stength, Fann Reading at X Time

DIFFERENTIAL PRESSURE STICKING:

Fs = (ΔP)*(A)*(f)
ΔP = Differential Pressure, psi
A = Contact Area Sq. In.
F = Coefficient of Friction (est. 0.3)
Fs = Sticking Force, lbs.

ESTIMATING FREE POINT DEPTH:

$$L = \frac{735{,}000\ (W)\ (\Delta E)}{\Delta F}$$

L = Length of Free Pipe, Ft.
W = Weight of Pipe, p.p.f.
ΔE = Differential Stretch, Inches due to ΔF
ΔF = Differential Weight in Tension, Lbs.

BUOYANCY TABLE:

S.G.	PPG	M	S.G.	PPG	M
.738	6.160	.905	1.439	12.000	.816
.849	7.085	.891	1.559	13.000	.800
1.000	8.337	.872	1.679	14.000	.785
1.079	9.000	.862	1.799	15.000	.770
1.199	10.000	.846	1.919	16.000	.754
1.319	11.000	.831	2.039	17.000	.739

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USEFUL EQUATIONS

FLUID VELOCITY:

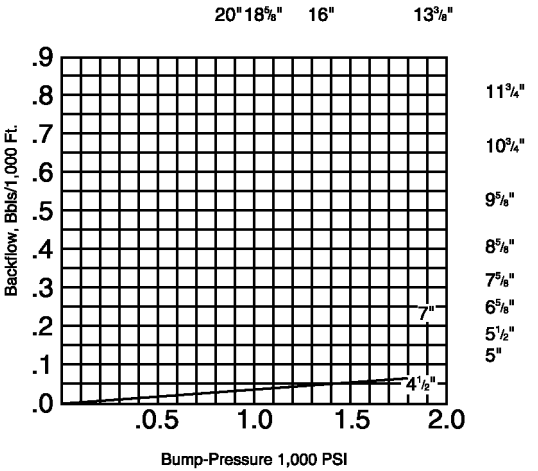
$$Va = \frac{17.158\ (Q)}{(Dh^2 — Dp^2)}$$

Va = Annular Velocity, Ft./Sec.
Q = Bbls. per Minute

$$Vp = \frac{17.158\ (Q)}{(D^2)}$$

Vp = Velocity Inside Casing, Ft./Sec.

APPROX. BACKFLOW VS. BUMP-PRESSURE PER 1,000 FT. CASING



CASING PLUGS:

Mud wiped from walls by plug
For 1/32" film per 1,000 ft. of casing

Casing	Bbl. Mud	Feet Fill up
4½", 13.5 p.p.f.	0.45	30.0
5½", 17.0 p.p.f.	0.59	25.4
7", 23 p.p.f.	0.77	19.6
9⅝", 43.50 p.p.f.	1.06	14.2
10¾", 40.5 p.p.f.	1.22	12.4
13⅜", 54.5 p.p.f.	1.52	10.0

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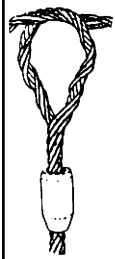
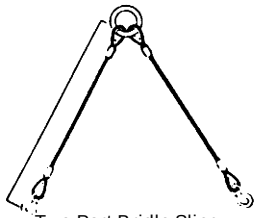
MECHANICAL SPLICED SLINGS
WORKING LOAD LIMITS

 Flemish Eye Loop	Vertical Lift	Choker Hitch	Basket Hitch	 Two Part Bridle Sling		
				60°	90°	120°
				W.L.L. 2 Legs	W.L.L. 2 Legs	W.L.L. 2 Legs
Rope Size (Inches)	Tons (2000 lb)	Tons (2000 lb)	Tons (2000 lb)	Tons 2000 lb)	Tons (2000 lb)	Tons (2000 lb)
1/4	.60	.45	1.20	1.00	.84	.60
3/8	1.34	1.00	2.65	2.30	1.85	1.34
1/2	2.40	1.80	4.80	4.10	3.35	2.40
5/8	3.50	2.60	7.00	6.20	5.00	3.50
3/4	5.40	4.00	10.80	9.20	7.50	5.40
7/8	7.00	5.20	14.00	12.00	9.80	7.00
1	9.10	6.80	18.20	16.00	13.00	9.10
1-1/8	11.30	8.40	22.60	19.40	15.80	11.30
1-1/4	13.50	10.10	27.00	23.20	18.90	13.50
1-3/8	16.40	12.30	32.80	28.20	22.90	16.40
1-1/2	19.40	15.00	38.80	34.00	27.10	19.40
1-5/8	23.50	17.60	47.00	40.40	32.90	23.50
1-3/4	27.00	20.20	54.00	46.40	37.80	27.00
1-7/8	30.50	22.80	61.00	52.40	47.70	30.50
2	35.00	26.00	70.00	60.00	49.00	35.00

All loads calculated on 5-1 working load factor and based on the use of preformed, improved plow steel, 6 x 19 or 6 x 37 classification wire rope, with independent wire rope core.

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HYDROGEN SULPHIDE
(H_2S - SOUR GAS)
SAFETY INFORMATION

TOXICITY*		
1 PPM 1/10,000 of 1%	Can be smelled	CAUTION
10 PPM 1/1,000 of 1%	8 hr. worker exposure level	
20 PPM 2/1,000 of 1%	Worker exposure ceiling	
100 PPM 1/100 of 1%	Loss of smell, 2-5 min. may burn throat, cause headache and nausea	DANGEROUS
200 PPM 2/100 of 1%	Sense of smell lost rapidly, burns eyes and throat	
500 PPM 5/100 of 1%	Loss of reasoning and balance, respiratory disturbances in 2-15 min., prompt resuscitation needed	
700 PPM 7/100 of 1%	Immediate unconsciousness, causes seizures, breathing will stop and death will result if not rescued promptly.	
1000 PPM 1/10 of 1%	Causes immediate unconsciousness, death or brain damage will result unless rescued promptly.	

**Toxicity measured in parts per million (PPM) or percent. 1 million PPM = 100%*

RESPONSE

1. Get out of the area
2. Sound an alarm
3. Don breathing apparatus
4. Rescue victim(s)
5. Revive victim(s)
6. Get medical aid

SOURCES

Drilling Rigs

- mud returns
- B.O.P.s
- flow nipple
- substructure
- shale shaker
- degasser
- choke manifold
- mud system

Service Rigs

- circulation tanks
- production tanks
- circulating
- swabbing
- wellhead
- lubricators
- tank agitation
- tank cleaning
- tank gauge hatches
- tank ventines
- kill fluids
- circulating pumps

Production Operations

- storage tanks
- separators & treaters
- dehydrators
- pig senders &
- pipelines
- flare pits & flare stacks
- loading facilities
- meter stations
- compressors
- buildings

Plants

- seals
- fittings
- flanges
- process vessels
- drains
- sample valves
- ruptures

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DETECTION

Ampoule: Lead acetate soaked fabric is exposed to H_2S by crushing its glass container. Any H_2S contamination discolors the lead acetate. If ampoule darkens, get out of the area and report the H_2S. This is an H_2S indicator only and is not for use in determining accurate levels of concentration.

Detector Tube: A glass tube showing concentration readings is used in conjunction with a vacuum pump. Atmospheric samples are drawn into the tube with the pump. The length of the discolorations is used to determine the concentration. Accurate within a range of 25% of reading indicated in PPM on tube.

Continuous Detectors: These devices are electronic and the most accurate. They are available as:

Personal Monitors: Battery operated and worn on the exterior of clothing. Some are rechargeable and others use batteries. They all contain charge level indicators to test effectiveness. These contain alarms which alert the wearer at preset levels. Some contain H_2S readout in PPM.

Portable Continuous Monitors: These can be moved around and placed at strategic points. May operate on batteries or with AC power. They contain a sensor, a meter, a remote switch, and alarm. Have continuous readout of H2S concentration and trigger alarm at preset levels, typically 10 PPM. Some units must warm-up to function properly.

Fixed Continuous Monitors: These are typically used in installations such as gas plants or oil batteries. Most use AC power, but newer ones use solar power. They may be part of a system which uses several sensors placed in strategic locations around the installation. The units must be calibrated to manufacturer's specifications prior to use. Can be used for drilling and servicing operations on "critical" wells.

PROPERTIES

Color

Colorless and invisible. It cannot be detected with the eyes which makes it extremely dangerous.

Odor

It has a distinctive, offensive smell, similar to "rotten eggs" thus the name "sour gas". But even in low concentrations it is so toxic that it attacks and quickly impairs the sense of smell. It could be fatal to rely on smell for detection.

Vapor Density

It is heavier than air so it tends to settle in low lying areas like pits, cellars or tanks. If in an area where H_2S is known to exist, protect yourself. Wherever possible, work upwind and keep to higher ground. Vapor density is 1.189 while air is 1.0.

Explosive Limits

Mixed with the right amount of air or oxygen, H_2S will explode, creating another danger besides poisoning. Explosive limits are 4.3% to 46% by volume.

Flammability

It burns with a distinctive blue flame, producing sulphur dioxide (SO_2). This is also a hazardous gas which irritates eyes and lungs.

Solubility

The gas can be dissolved in liquids which means it can be present in any container or vessels used to carry or hold well fluids including oil, water, emulsion, drilling mud, completion or workover fluids or sludge. Under the right conditions simply agitating a fluid containing H_2S may release the gas into the air. Solubility is 4 parts H_2S to 1 part H_2O @0 degrees C.

Boiling Point

In liquid form it boils at a very low temperature, so it is usually found as a gas. Boiling point is -76 degrees F or -60 degrees C.

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H_2S SAFETY TIPS

- Always stop at entrance to location. Check conditions before proceeding.
- Do not store all breathing apparatus in one place.
- Check all apparatus regularly.
- Discuss and use buddy system at all times.
- Establish safe meeting areas.
- Verify and keep handy all emergency phone numbers.
- Always work upwind of potential sour gas source.
- When sour gas is suspected, mask-up and alert buddy before proceeding to check source.
- Follow H_2S response strategy if incident occurs.

PROTECTION

SUPPLIED AIR BREATHING APPARATUS - S.A.B.A.

SABA consists of four major components:

AIR SUPPLY: Must conform to C.S.A. standard Z-180, 1-M1978. Air can be supplied from a breathing air compressor but usually is supplied from a series of cylinders connected by a high pressure manifold. The air is regulated and distributed through an air line hose to the breathing apparatus.

AIR PRESSURE REGULATOR: The air pressure from the air supply is reduced by regulators at one or more points in the air supply system. These control the supply and pressure of air to the facepiece. A slight pressure is maintained (Pressure Demand Supplied Air Breathing Apparatus or Positive Pressure Apparatus) in the facepiece to prevent inward leakage of contaminated air. When the wearer inhales, the regulators admit more air into the facepiece to match the breathing pattern.

AIR EXHAUST: When the wearer exhales, the air is vented directly to the atmosphere through an exhalation valve in mask of the facepiece.

EGRESS CYLINDER: When used in hazardous atmospheres, SABA units must be equipped with an egress cylinder. This cylinder contains enough air to allow the wearer to escape the hazardous area in the event the hose becomes tangled or cut, or the air supply is shut-off in some way. A five-minute air supply is standard.

SELF-CONTAINED BREATHING APPARATUS - S.C.B.A.

SCBA consists of four major components:

AIR SUPPLY: All units supply air form a cylinder worn by the user. The supply to the user is controlled by a diaphragm in the regulator. The diaphragm is supplied by a low pressure air supply form a cylinder. The mainline valve should be opened fully. The maximum capacity of most cylinders is 30 minutes. When approximately one-quarter of the air is left, an audible alarm sounds. At this point there may be five minutes or less of air remaining, therefore the wearer must evacuate to a safe area immediately. Some people use up the air more quickly than others.

FACEPIECE: This consists of head straps, breathing tube, exhalation valve, and face-shield. The most critical feature is the seal to the face, which is essential for protection from H_2S. The seal can only be effective if the wearer is clean-shaven and the head straps are properly adjusted.

HARNESS: One of the most important features of SCBAs is their portability. The harness supports the air cylinder and connects it through the regulator to the facepiece.

REGULATOR: The air pressure from the cylinder is reduced by a regulator. This controls the supply and the pressure of air to the facepiece. A slight pressure is maintained inside the facepiece to prevent inward leakage of contaminated air. When the wearer inhales. the regulator admits more air into the facepiece to match the breathing pattern. If anything happens to damage or disable the regulator, a by-pass valve activates a continuous stream of air to the facepiece. The wearer should move to a safe environment if this occurs.

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DIMENSIONS AND WEIGHTS

of seamless and welded steel pipe,
conform to ANSI B36. 10 and API5L and 5LX Standards.

+ Thickness not provided by ANSIB 36.10 Std.
☆ Thickness of "Special" pipe under API 5L Std.
• Thickness of "Special" pipe under API 5LX Std.

STD = Standard
XS = Extra Strong
XXS = Double Extra Strong.

Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch **mm**	inch	**mm**	lb/ft	**kg/m**		
1/8	0.405	0.068	**1.73**	0.245	**0.364**	STD	40
	10.3	0.095	**2.41**	0.315	**0.468**	XS	80
1/4	0.540	0.088	**2.23**	0.424	**0.631**	STD	40
	13.7	0.119	**3.02**	0.535	**0.796**	XS	80
3/8	0.675	0.091	**2.31**	0.57	**0.849**	STD	40
	17.1	0.126	**3.20**	0.74	**1.10**	XS	80
1/2	0.840	0.109	**2.77**	0.85	**1.27**	STD	40
	21.3	0.147	**3.73**	1.09	**1.62**	XS	80
		0.188	**4.78**	1.31	**1.95**		160
		0.294	**7.47**	1.714	**2.55**	XXS	
3/4	1.050	0.113	**2.87**	1.13	**1.68**	STD	40
	26.7	0.154	**3.91**	1.47	**2.19**	XS	80
		0.219	**5.56**	1.94	**2.89**		160
		0.308	**7.82**	2.44	**3.63**	XXS	
1	1.315	0.133	**3.38**	1.68	**2.50**	STD	40
	33.4	0.179	**4.55**	2.17	**3.23**	XS	80
		0.250	**6.35**	2.84	**4.23**		160
		0.358	**9.09**	3.66	**5.45**	XXS	
1-1/4	1.660	0.140	**3.56**	2.27	**3.38**	STD	40
	42.2	0.191	**4.85**	3.00	**4.47**	XS	80
		0.250	**6.35**	3.76	**5.60**		160
		0.382	**9.70**	5.21	**7.76**	XXS	
1-1/2	1.900	0.145	**3.68**	2.72	**4.05**	STD	40
	48.3	0.200	**5.08**	3.63	**5.41**	XS	80
		0.281	**7.14**	4.86	**7.24**		160
		0.400	**10.16**	6.41	**9.55**	XXS	
2	2.375	0.083	**2.11**	2.03	**3.02**		
	60.3	0.109	**• 2.77**	2.64	**3.93**		
		0.125	**• 3.18**	3.00	**4.47**		
		0.141	**• 3.58**	3.36	**5.00**		

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Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch mm	inch	mm	lb/ft	kg/m		
2	2.375	0.154	**3.91**	3.65	**5.44**	STD	40
	60.3	0.172	**4.37**	4.05	**6.03**		
		0.188	**4.78**	4.39	**6.54**		
		0.218	**5.54**	5.02	**7.48**	XS	80
		0.250	**6.35**	5.67	**8.45**		
		0.281	**7.14**	6.28	**9.35**		
		0.344	**8.74**	7.44	**11.11**		160
		0.436	**11.07**	9.03	**13.45**	XXS	
2-1/2	2.875	0.083	**2.11**	2.47	**3.68**		
	73.0	0.109	**• 2.77**	3.22	**4.80**		
		0.125	**• 3.18**	3.67	**5.46**		
		0.141	**• 3.58**	4.12	**6.14**		
		0.156	**3.96**	4.53	**6.75**		
		0.172	**4.37**	4.97	**7.40**		
		0.188	**4.78**	5.40	**8.04**		
		0.203	**5.16**	5.79	**8.62**	STD	40
		0.216	**5.49**	6.13	**9.13**		
		0.250	**6.35**	7.01	**10.44**		
		0.276	**7.01**	7.66	**11.41**	XS	80
		0.375	**9.52**	10.01	**14.91**		160
		0.552	**14.02**	13.69	**20.41**	XXS	
3	3.500	0.083	**2.11**	3.03	**4.51**		
	88.9	0.109	**☆• 2.77**	3.95	**5.88**		
		0.125	**☆• 3.18**	4.51	**6.72**		
		0.141	**☆• 3.58**	5.06	**7.54**		
		0.156	**☆• 3.96**	5.57	**8.30**		
		0.172	**4.37**	6.11	**9.10**		
		0.188	**4.78**	6.65	**9.91**		
		0.216	**5.49**	7.58	**11.29**	STD	40
		0.250	**6.35**	8.68	**12.93**		
		0.281	**7.14**	9.66	**14.39**		
		0.300	**7.62**	10.25	**15.27**	XS	80
		0.438	**11.13**	14.32	**21.23**		160
		0.600	**15.24**	18.58	**27.67**	XXS	
3-1/2	4.000	0.125	**☆• 3.18**	5.17	**7.70**		
	101.6	0.141	**☆• 3.58**	5.81	**8.65**		
		0.156	**☆• 3.96**	6.40	**9.53**		
		0.172	**☆ 4.37**	7.03	**10.47**		

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Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch mm	inch	mm	lb/ft	kg/m		
3-1/2	4.000	0.188	☆ 4.78	7.65	11.39		
	101.6	0.226	☆ 5.74	9.11	13.57	STD	40
		0.250	☆ 6.35	10.01	14.91		
		0.281	☆ 7.14	11.16	16.62		
		0.318	8.08	12.50	18.63	XS	80
		0.636	16.15	22.85	34.00	XXS	
4	4.500	0.083	2.11	3.92	5.84		
	114.3	0.109	☆ 2.77	5.11	7.61		
		0.125	☆• 3.18	5.84	8.70		
		0.141	☆• 3.58	6.56	9.77		
		0.156	☆• 3.96	7.24	10.78		
		0.172	☆ 4.37	7.95	11.84		
		0.188	4.78	8.66	12.90		
		0.203	5.16	9.32	13.88		
		0.219	5.56	10.01	14.91		
		0.237	6.02	10.79	16.07	STD	40
		0.250	6.35	11.35	16.91		
		0.281	7.14	12.66	18.86		
		0.312	7.92	13.96	20.79		
		0.337	8.56	14.98	22.31	XS	80
		0.438	11.13	19.00	28.30		120
		0.531	13.49	22.51	33.53		160
		0.674	17.12	27.54	41.02	XXS	
5	5,563	0.109	2.77	6.35	9.45		
	141.3	0.156	☆ 3.96	9.01	13.42		
		0.188	☆ 4.78	10.79	16.07		
		0.219	☆ 5.56	12.50	18.62		
		0.258	☆ 6.55	14.62	21.78	STD	40
		0.281	☆ 7.14	15.85	23.61		
		0.312	☆ 7.92	17.50	26.07		
		0.344	☆ 8.74	19.17	28.55		
		0.375	9.52	20.78	30.95	XS	80
		0.500	☆ 12.70	27.04	40.28		120
		0.625	☆ 15.88	32.96	49.09		160
		0.750	19.05	38.55	57.42	XXS	
6	6.625	0.109	2.77	7.59	11.31		
	168.3	0.125	☆• 3.18	8.68	12.93		
		0.141	☆• 3.58	9.76	14.54		

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Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch mm	inch	mm	lb/ft	kg/m		
6	6.625	0.156	☆• 3.96	10.78	16.06		
	168.3	0.172	4.37	11.85	17.65		
		0.188	4.78	12.92	19.24		
		0.203	5.16	13.92	20.73		
		0.219	5.56	14.98	22.31		
		0.250	6.35	17.02	25.35		
		0.280	7.11	18.97	28.26	STD	40
		0.312	7.92	21.04	31.34		
		0.344	8.74	23.08	34.38		
		0.375	9.52	25.03	37.28		
		0.432	10.97	28.57	42.56	XS	80
		0.500	12.70	32.71	48.72		
		0.562	14.27	36.39	54.20		120
		0.625	15.88	40.05	59.65		
		0.719	18.26	45.35	67.55		160
		0.864	21.95	53.16	79.18	XXS	
8	8.625	0.125	3.18	11.35	16.93		
	219.1	0.156	☆• 3.96	14.11	21.02		
		0.188	4.78	16.94	25.23		
		0.203	5.16	18.26	27.20		
		0.219	5.56	19.66	29.28		
		0.250	6.35	22.36	33.31		20
		0.277	7.04	24.70	36.79		30
		0.312	7.92	27.70	41.26		
		0.322	8.18	28.55	42.53	STD	40
		0.344	8.74	30.42	45.31		
		0.375	9.52	33.04	49.21		
		0.406	10.31	35.64	53.08		60
		0.438	11.13	38.30	57.05		
		0.500	12.70	43.39	64.63	XS	80
		0.562	14.27	48.40	72.09		
		0.594	15.09	50.95	75.89		100
		0.625	15.88	53.40	79.54		
		0.719	18.26	60.71	90.43		120
		0.812	20.62	67.76	100.93		140
		0.875	22.22	72.42	107.87	XXS	
		0.906	23.01	74.69	111.25		160
10	10.750	0.125	3.18	14.18	21.10		
	273.0	0.134	3.40	15.25	22.70		

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Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch mm	inch	mm	lb/ft	kg/m		
10	10.750	0.141	3.58	15.98	23.69		
	273.0	0.156	☆• 3.96	17.65	26.29		
		0.172	4.37	19.43	28.92		
		0.188	☆• 4.78	21.21	31.59		
		0.203	• 5.16	22.87	34.06		
		0.219	5.56	24.63	36.69		
		0.250	6.35	28.04	41.77		20
		0.279	7.09	31.20	46.47		
		0.307	7.80	34.24	51.00		30
		0.344	8.74	38.23	56.94		
		0.365	9.27	40.48	60.29	STD	40
		0.438	11.13	48.24	71.85		
		0.500	12.70	54.74	81.54	XS	60
		0.562	14.27	61.15	91.08		
		0.594	15.09	64.43	95.97		80
		0.625	15.88	67.58	100.66		
		0.719	18.26	77.03	114.74		100
		0.812	20.62	86.18	128.37		
		0.844	21.44	89.29	133.00		120
		1.000	25.40	104.13	155.10	XXS	140
		1.125	28.58	115.64	172.25		160
12	12.750	0.141	3.58	18.99	28.26		
	323.8	0.156	3.96	20.98	31.22		
		0.172	☆• 4.37	23.11	34.42		
		0.188	☆• 4.78	25.22	37.57		
		0.203	• 5.16	27.20	40.51		
		0.219	☆• 5.56	29.31	43.66		
		0.250	6.35	33.38	49.72		20
		0.281	7.14	37.42	55.74		
		0.312	7.92	41.45	61.74		
		0.330	8.38	43.77	65.20		30
		0.344	8.74	45.58	67.89		
		0.375	9.52	49.56	73.82	STD	
		0.406	10.31	53.52	79.72		40
		0.438	11.13	57.59	85.78		
		0.500	12.70	65.42	97.44	XS	
		0.562	14.27	73.15	108.96		60
		0.625	15.88	80.93	120.55		

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Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch mm	inch	mm	lb/ft	kg/m		
12	12.750	0.688	17.48	88.63	132.01		80
	323.8	0.750	19.05	96.12	143.17		
		0.812	† 20.62	103.53	154.21		
		0.844	21.44	107.32	159.85		100
		0.875	† 22.22	110.97	165.29		
		1.000	25.40	125.49	186.92	XXS	120
		1.125	28.58	139.67	208.04		140
		1.312	33.32	160.27	238.72		160
14	14.000	0.188	☆• 4.78	27.73	41.30		
	355.6	0.203	☆ 5.16	29.91	44.55		
		0.210	• 5.33	30.93	46.07		
		0.219	• 5.56	32.23	48.01		
		0.250	☆• 6.35	36.71	54.68		10
		0.281	☆• 7.14	41.17	61.32		
		0.312	7.92	45.61	67.94		20
		0.344	8.74	50.17	74.73		
		0.375	9.52	54.57	81.28	STD	30
		0.406	10.31	58.94	87.79		
		0.438	11.13	63.44	94.49		
		0.469	11.91	67.78	100.96		
		0.500	12.70	72.09	107.38	XS	
		0.562	14.27	80.66	120.14		
		0.594	15.09	85.05	126.68		60
		0.625	15.88	89.28	132.98		
		0.688	17.48	97.81	145.69		
		0.750	19.05	106.13	158.08		80
		0.812	20.62	114.37	170.35		
		0.875	† 22.22	122.65	182.69		
		0.938	23.83	130.85	194.90		100
		1.094	27.79	150.79	224.60		120
		1.250	31.75	170.21	253.53		140
		1.406	35.71	189.11	281.68		160
16	16.000	0.188	☆• 4.78	31.75	47.29		
	406.4	0.203	☆• 5.16	34.25	51.02		
		0.219	☆• 5.56	36.91	54.98		
		0.250	☆• 6.35	42.05	62.63		10
		0.281	☆• 7.14	47.17	70.26		
		0.312	7.92	52.27	77.86		20

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Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch mm	inch	mm	lb/ft	kg/m		
16	16.000	0.344	**8.74**	57.52	**85.68**		
	406.4	0.375	**9.52**	62.58	**93.21**	STD	30
		0.406	**10.31**	67.62	**100.72**		
		0.438	**11.13**	72.80	**108.44**		
		0.469	**11.91**	77.79	**115.87**		
		0.500	**12.70**	82.77	**123.29**	XS	40
		0.562	**14.27**	92.66	**138.02**		
		0.625	**15.88**	102.63	**152.87**		
		0.656	**16.66**	107.50	**160.12**		60
		0.688	**17.48**	112.51	**167.58**		
		0.750	**19.05**	122.15	**181.94**		
		0.812	**20.62**	131.71	**196.18**		
		0.844	**21.44**	136.61	**203.48**		80
		0.875	**† 22.22**	141.34	**210.53**		
		0.938	**† 23.83**	150.89	**224.75**		
		1.000	**† 25.40**	160.20	**238.62**		
		1.031	**26.19**	164.82	**245.50**		100
		1.062	**† 26.97**	169.43	**252.37**		
		1.125	**† 28.58**	178.72	**266.20**		
		1.219	**30.96**	192.43	**286.62**		120
		1.438	**36.53**	223.64	**333.11**		140
		1.594	**40.49**	245.25	**365.30**		160
18	18.000	0.188	**☆• 4.78**	35.76	**53.26**		
	457.2	0.203	**☆• 5.16**	38.58	**57.41**		
		0.219	**☆• 5.56**	41.59	**61.95**		
		0.250	**☆• 6.35**	47.39	**70.59**		10
		0.281	**☆• 7.14**	53.18	**79.21**		
		0.312	**7.92**	58.94	**87.79**		20
		0.344	**8.74**	64.87	**96.62**		
		0.375	**9.52**	70.59	**105.14**	STD	
		0.406	**10.31**	76.29	**113.63**		
		0.438	**11.13**	82.15	**122.36**		30
		0.469	**11.91**	87.81	**130.79**		
		0.500	**12.70**	93.45	**139.19**	XS	
		0.562	**14.27**	104.67	**155.91**		40
		0.625	**15.88**	115.98	**172.75**		
		0.688	**17.48**	127.21	**189.48**		
		0.750	**19.05**	138.17	**205.80**		60

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Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch mm	inch	mm	lb/ft	kg/m		
18	18.000	0.812	**20.62**	149.06	**222.02**		
	457.2	0.875	**† 22.22**	160.03	**238.36**		
		0.938	**23.83**	170.92	**254.59**		80
		1.000	**† 25.40**	181.56	**270.43**		
		1.062	**† 26.97**	192.11	**286.15**		
		1.125	**† 28.58**	202.75	**302.00**		
		1.156	**29.36**	207.96	**309.76**		100
		1.187	**† 30.15**	213.14	**317.47**		
		1.250	**† 31.75**	223.61	**333.07**		
		1.375	**34.92**	244.14	**363.65**		120
		1.562	**39.67**	274.22	**408.45**		140
		1.781	**45.24**	308.50	**459.51**		160
20	20.000	0.188	**4.78**	39.78	**59.20**		
	508.0	0.203	**5.16**	42.92	**63.87**		
		0.219	**☆• 5.56**	46.27	**68.92**		
		0.250	**☆• 6.35**	52.73	**78.54**		10
		0.281	**☆• 7.14**	59.18	**88.15**		
		0.312	**7.92**	65.60	**97.71**		
		0.344	**8.74**	72.21	**107.56**		
		0.375	**9.52**	78.60	**117.07**	STD	20
		0.406	**10.31**	84.96	**126.55**		
		0.438	**11.13**	91.51	**136.30**		
		0.469	**11.91**	97.83	**145.72**		
		0.500	**12.70**	104.13	**155.10**	XS	30
		0.562	**14.27**	116.67	**173.78**		
		0.594	**15.09**	123.11	**183.37**		40
		0.625	**15.88**	129.33	**192.64**		
		0.688	**17.48**	141.90	**211.36**		
		0.750	**19.05**	154.19	**229.67**		
		0.812	**20.62**	166.40	**247.85**		60
		0.875	**† 22.22**	178.72	**266.20**		
		0.938	**† 23.83**	190.96	**284.43**		
		1.000	**† 25.40**	202.92	**302.25**		
		1.031	**26.19**	208.87	**311.11**		80
		1.062	**† 26.97**	214.80	**319.94**		
		1.125	**† 28.58**	226.78	**337.79**		
		1.187	**† 30.15**	238.50	**355.25**		
		1.250	**† 31.75**	250.31	**372.84**		

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Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch mm	inch	mm	lb/ft	kg/m		
20	20.000	1.281	**32.54**	256.10	**381.46**		100
	508.0	1.312	**† 33.32**	261.86	**390.04**		
		1.375	**† 34.92**	273.51	**407.39**		
		1.500	**38.10**	296.37	**441.44**		120
22	22,000	0.188	**4.78**	43.80	**65.18**		
	558.8	0.203	**5.16**	47.26	**70.33**		
		0.219	**5.56**	50.94	**75.81**		
		0.250	**• 6.35**	58.07	**86.42**		10
		0.281	**☆• 7.14**	65.18	**97.09**		
		0.312	**7.92**	72.27	**107.65**		
		0.344	**8.74**	79.56	**118.50**		
		0.375	**9.52**	86.61	**129.01**	STD	20
		0.406	**10.31**	93.63	**139.46**		
		0.438	**11.13**	100.86	**150.23**		
		0.469	**11.91**	107.85	**160.64**		
		0.500	**12.70**	114.81	**171.01**	XS	30
		0.562	**14.27**	128.67	**191.65**		
		0.625	**15.88**	142.68	**212.52**		
		0.688	**17.48**	156.60	**233.26**		
		0.750	**19.05**	170.21	**253.53**		
		0.812	**20.62**	183.75	**273.70**		
		0.875	**22.22**	197.41	**294.04**		60
		0.938	**† 23.83**	211.00	**314.28**		
		1.000	**† 25.40**	224.28	**334.07**		
		1.062	**† 26.97**	237.48	**353.73**		
		1.125	**28.58**	250.81	**373.58**		80
		1.187	**† 30.15**	263.85	**393.00**		
		1.250	**31.75**	277.01	**412.61**		
		1.312	**† 33.32**	289.88	**431.78**		
		1.375	**34.92**	302.88	**451.14**		100
		1.437	**† 36.50**	315.58	**470.06**		
		1.500	**† 38.10**	328.41	**489.17**		
24	24.000	0.188	**4.78**	47.81	**71.15**		
	609.6	0.203	**5.16**	51.59	**76.77**		
		0.219	**5.56**	55.62	**82.77**		
		0.250	**6.35**	63.41	**94.36**		10
		0.281	**☆• 7.14**	71.18	**106.02**		
		0.312	**7.92**	78.93	**117.57**		

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Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch mm	inch	mm	lb/ft	kg/m		
24	24.000	0.344	**8.74**	86.91	**129.45**		
	609.6	0.375	**9.52**	94.62	**140.94**	STD	20
		0.406	**10.31**	102.31	**152.39**		
		0.438	**11.13**	110.22	**164.17**		
		0.469	**11.91**	117.86	**175.55**		
		0.500	**12.70**	125.49	**186.92**	XS	
		0.562	**14.27**	140.68	**209.54**		30
		0.625	**15.88**	156.03	**232.41**		
		0.688	**17.48**	171.29	**255.14**		40
		0.750	**19.05**	186.23	**277.39**		
		0.812	**20.62**	201.09	**299.52**		
		0.875	**† 22.22**	216.10	**321.88**		
		0.938	**23.83**	231.03	**344.12**		
		0.969	**24.61**	238.35	**355.02**		60
		1.000	**† 25.40**	245.64	**365.88**		
		1.062	**26.97**	260.17	**387.52**		
		1.125	**† 28.58**	274.84	**409.37**		
		1.187	**† 30.15**	289.20	**430.76**		
		1.219	**30.96**	296.58	**441.76**		80
		1.250	**† 31.75**	303.71	**452.38**		
		1.312	**† 33.32**	317.91	**473.53**		
		1.375	**† 34.92**	332.25	**494.89**		
		1.437	**† 36.50**	346.28	**515.78**		
		1.500	**† 38.10**	360.45	**536.89**		
		1.531	**38.89**	367.39	**547.23**		100
		1.562	**† 39.67**	374.31	**557.53**		
		1.812	**46.02**	429.40	**639.02**		120
		2.062	**52.37**	483.10	**718.93**		140
		2.343	**59.51**	541.90	**806.43**		160
26	26.000	0.250	**6.35**	68.75	**102.31**		
	660.4	0.281	**7.14**	77.18	**114.86**		
		0.312	**7.92**	85.60	**127.39**		
		0.344	**8.74**	94.26	**140.40**		
		0.375	**9.52**	102.63	**152.87**	STD	
		0.406	**10.31**	110.98	**165.30**		
		0.438	**11.13**	119.57	**178.10**		
		0.469	**11.91**	127.88	**190.48**		
		0.500	**12.70**	136.17	**202.83**	XS	20

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Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch mm	inch	mm	lb/ft	kg/m		
26	26.000	0.562	14.27	152.68	227.42		
	660.4	0.625	15.88	169.38	252.29		
		0.688	17.48	185.99	277.03		
		0.750	19.05	202.25	301.25		
		0.812	† 20.62	218.43	325.35		
		0.875	† 22.22	234.79	349.72		
		0.938	23.83	251.07	373.97		
		1.000	† 25.40	267.00	397.70		
28	28.000	0.250	6.35	74.09	100.26		
	711.2	0.281	7.14	83.19	123.80		
		0.312	7.92	92.26	137.30		
		0.344	8.74	101.61	151.35		
		0.375	9.52	110.64	164.80	STD	
		0.406	10.31	119.65	178.22		
		0.438	11.13	128.93	192.04		
		0.469	11.91	137.90	205.40		
		0.500	12.70	146.85	218.73	XS	20
		0.562	14.27	164.69	245.31		
		0.625	15.88	182.73	272.18		30
		0.688	17.48	200.68	298.91		
		0.750	19.05	218.27	325.11		
		0.812	† 20.62	235.78	351.19		
		0.875	† 22.22	253.48	377.56		
		0.938	† 23.83	271.10	403.80		
		1.000	† 25.40	288.36	429.51		
30	30.000	0.250	6.35	79.43	118.20		
	762.0	0.281	7.14	89.18	132.71		
		0.312	7.92	98.93	147.22		
		0.344	8.74	108.95	162.28		
		0.375	9.52	118.65	176.73	STD	
		0.406	10.31	128.32	191.13		
		0.438	11.13	138.29	205.98		
		0.469	11.91	147.92	220.33		
		0.500	12.70	157.53	234.64	XS	20
		0.562	14.27	176.69	263.18		
		0.625	15.88	196.08	292.06		30
		0.688	17.48	215.38	320.81		
		0.750	19.05	234.29	348.97		

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Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch mm	inch	mm	lb/ft	kg/m		
30	30.000	0.812	† 20.62	253.12	377.02		
	762.0	0.875	† 22.22	272.17	405.40		
		0.938	† 23.83	291.14	433.65		
		1.000	† 25.40	309.72	461.33		
32	32.000	0.250	6.35	84.77	126.15		
	812.8	0.281	7.14	95.19	141.66		
		0.312	7.92	105.59	157.13		
		0.344	8.74	116.30	173.23		
		0.375	9.52	126.66	188.66	STD	
		0.406	10.31	136.99	204.05		
		0.438	11.13	147.64	219.91		
		0.469	11.91	157.94	235.25		
		0.500	12.70	168.21	250.55	XS	20
		0.562	14.27	188.70	281.07		
		0.625	15.88	209.43	311.95		30
		0.688	17.48	230.08	342.70		40
		0.750	19.05	250.31	372.84		
		0.812	† 20.62	270.47	402.87		
		0.875	† 22.22	290.86	433.24		
		0.938	23.83	311.17	463.08		
		1.000	25.40	331.08	492.70		
34	34.000	0.250	6.35	90.11	134.10		
	863.6	0.281	7.14	101.19	150.59		
		0.312	7.92	112.25	167.05		
		0.344	8.74	123.65	184.18		10
		0.375	9.52	134.67	200.59	STD	
		0.406	10.31	145.67	216.98		
		0.438	11.13	157.00	233.85		
		0.469	11.91	167.95	250.16		
		0.500	12.70	178.89	266.46	XS	20
		0.562	14.27	200.70	298.94		
		0.625	15.88	222.78	331.83		30
		0.750	19.05	266.33	396.35		
		0.875	22.22	309.55	460.66		
		1.000	25.40	352.44	524.49		
36	36.000	0.250	6.35	95.45	142.04		
	914.4	0.281	7.14	107.20	159.53		
		0.312	7.92	118.92	176.97		

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Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch mm	inch	mm	lb/ft	kg/m		
36	36.000	0.344	**8.74**	131.00	**195.12**		
	914.4	0.375	**9.52**	142.68	**212.52**	STD	
		0.406	**10.31**	154.34	**229.89**		
		0.438	**11.13**	166.35	**247.78**		
		0.469	**11.91**	177.97	**265.09**		
		0.500	**12.70**	189.57	**282.36**	XS	20
		0.562	**14.27**	212.70	**316.82**		
		0.625	**15.88**	236.13	**351.40**		
		0.750	**19.05**	282.35	**420.19**		
		0.875	**22.22**	328.24	**488.48**		
		1.000	**25.40**	373.80	**556.27**		
38	38.000	0.250	**6.35**	100.79	**149.99**		
	965.2	0.312	**7.92**	125.58	**186.88**		
		0.344	**8.74**	138.35	**205.89**		
		0.375	**9.52**	150.69	**224.25**	STD	
		0.406	**10.31**	163.01	**242.58**		
		0.438	**11.13**	175.71	**261.48**		
		0.469	**11.91**	187.99	**279.76**		
		0.500	**12.70**	200.25	**298.00**	XS	
		0.625	**15.88**	249.48	**371.27**		
		0.750	**19.05**	298.37	**444.03**		
		0.875	**22.22**	346.93	**516.29**		
		1.000	**25.40**	395.16	**588.06**		
40	40.000	0.250	**6.35**	106.13	**157.94**		
	1016.0	0.312	**7.92**	132.25	**196.81**		
		0.344	**8.74**	145.69	**216.81**		
		0.375	**9.52**	158.70	**236.17**	STD	
		0.406	**10.31**	171.68	**255.49**		
		0.438	**11.13**	185.06	**275.40**		
		0.469	**11.91**	198.01	**294.67**		
		0.500	**12.70**	210.93	**313.90**	XS	
		0.625	**15.88**	262.83	**391.13**		
		0.750	**19.05**	314.39	**467.86**		
		0.875	**22.22**	365.62	**544.10**		
		1.000	**25.40**	416.52	**619.85**		
42	42.000	0.250	**6.35**	111.47	**165.89**		
	1066.8	0.312	**7.92**	138.91	**206.72**		
		0.344	**8.74**	153.04	**227.75**		

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Size		Wall Thickness		Weight		Identification	
Nominal	Outside Diameter					STD XS XXS	Schedule No.
Inch	inch **mm**	inch	**mm**	lb/ft	**kg/m**		
42	42.000	0.375	**9.52**	166.71	**248.09**	STD	
	1066.8	0.406	**10.31**	180.35	**268.39**		
		0.438	**11.13**	194.42	**289.33**		
		0.469	**11.91**	208.03	**309.58**		
		0.500	**12.70**	221.61	**329.79**	XS	
		0.625	**15.88**	276.18	**411.00**		
		0.750	**19.05**	330.41	**491.70**		
		0.875	**22.22**	384.31	**571.91**		
		1.000	**25.40**	437.88	**651.64**		
48	48.000	0.250	**6.35**	127.49	**189.73**		
	1219.20	0.312	**7.92**	158.90	**236.47**		
		0.344	**8.74**	175.08	**260.55**		
		0.375	**9.52**	190.74	**283.85**	STD	
		0.406	**10.31**	206.37	**307.11**		
		0.438	**11.13**	222.49	**331.10**		
		0.469	**11.91**	238.08	**354.30**		
		0.500	**12.70**	253.65	**377.47**	XS	
		0.625	**15.88**	316.23	**470.60**		
		0.750	**19.05**	378.47	**563.22**		
		0.875	**22.22**	440.38	**655.36**		
		1.000	**25.40**	501.96	**747.00**		
54	54.000	0.312	**7.92**	179.18	**266.65**		
	1371.6	0.375	**9.52**	214.77	**319.61**	STD	
		0.438	**11.13**	250.27	**372.44**		
		0.500	**12.70**	285.69	**425.15**	XS	
		0.750	**19.05**	426.53	**634.74**		
		1.000	**25.40**	566.04	**842.36**		
60	60.000	0.312	**7.92**	199.21	**296.46**		
	1524.0	0.375	**9.52**	238.80	**353.37**	STD	
		0.438	**11.13**	278.31	**414.17**		
		0.500	**12.70**	317.73	**472.83**	XS	
		0.750	**19.05**	474.59	**706.27**		
		1.000	**25.40**	630.12	**937.72**		

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ANSI FORGED STEEL FLANGES

150 Lb. Flanges								300 Lb. Flanges							400 Lb. Flanges							
Nom. Pipe Size	O	C[2]	Weld Neck	Y2 Slip on Thrd.	Lap Joint	Bolt Circle	No. and Size of Holes	O	C[2]	Weld Neck	Y2 Slip on Thrd.	Lap Joint	Bolt Circle	No. and Size of Holes	O	C[2]	Weld Neck	Y2 Slip on Thrd.	Lap Joint	Bolt Circle	No. and Size of Holes	Nom. Pipe Size
1/2	3-1/2	7/16	1-7/8	5/8	5/8	2-3/8	4-5/8	3-3/4	9/16	2-1/16	7/8	7/8	2-5/8	4-5/8	3-3/4	9/16	2-1/16	7/8	7/8	2-5/8	4-5/8	1/2
3/4	3-7/8	1/2	2-1/16	5/8	5/8	2-3/4	4-5/8	4-5/8	5/8	2-1/4	1	1	3-1/4	4-3/4	4-5/8	5/8	2-1/4	1	1	3-1/4	4-3/4	3/4
1	4-1/4	9/16	2-3/16	11/16	11/16	3-1/8	4-5/8	4-7/8	11/16	2-7/16	1-1/16	1-1/16	3-1/2	4-3/4	4-7/8	11/16	2-7/16	1-1/16	1-1/16	3-1/2	4-3/4	1
1-1/4	4-5/8	5/8	2-1/4	13/16	13/16	3-1/2	4-5/8	5-1/4	3/4	2-9/16	1-1/16	1-1/16	3-7/8	4-3/4	5-1/4	13/16	2-5/8	1-1/8	1-1/8	3-7/8	4-3/4	1-1/4
1-1/2	5	11/16	2-7/16	7/8	7/8	3-7/8	4-5/8	6-1/8	13/16	2-11/16	1-3/16	1-3/16	4-1/2	4-7/8	6-1/8	7/8	2-3/4	1-1/4	1-1/4	4-1/2	4-7/8	1-1/2
2	6	3/4	2-1/2	1	1	4-3/4	4-3/4	6-1/2	7/8	2-3/4	1-5/16	1-5/16	5	8-3/4	6-1/2	1	2-7/8	1-7/16	1-7/16	5	8-3/4	2
2-1/2	7	7/8	2-3/4	1-1/8	1-1/8	5-1/2	4-3/4	7-1/2	1	3	1-1/2	1-1/2	5-7/8	8-7/8	7-1/2	1-1/8	3-1/8	1-5/8	1-5/8	5-7/8	8-7/8	2-1/2
3	7-1/2	15/16	2-3/4	1-3/16	1-3/16	6	4-3/4	8-1/4	1-1/8	3-1/8	1-11/16	1-11/16	6-5/8	8-7/8	8-1/4	1-1/4	3-1/4	1-13/16	1-13/16	6-5/8	8-7/8	3
3-1/2	8-1/2	15/16	2-13/16	1-1/4	1-1/4	7	8-3/4	9	1-3/16	3-3/16	1-3/4	1-3/4	7-1/4	8-7/8	9	1-3/8	3-3/8	1-15/16	1-15/16	7-1/4	8 - 1	3-1/2
4	9	15/16	3	1-5/16	1-5/16	7-1/2	8-3/4	10	1-1/4	3-3/8	1-7/8	1-7/8	7-7/8	8-7/8	10	1-3/8	3-1/2	2	2	7-7/8	8 - 1	4
5	10	15/16	3-1/2	1-7/16	1-7/16	8-1/2	8-7/8	11	1-3/8	3-7/8	2	2	9-1/4	8-7/8	11	1-1/2	4	2-1/8	2-1/8	9-1/4	8 - 1	5
6	11	1	3-1/2	1-9/16	1-9/16	9-1/2	8-7/8	12-1/2	1-7/16	3-7/8	2-1/16	2-1/16	10-5/8	12-7/8	12-1/2	1-5/8	4-1/16	2-1/4	2-1/4	10-5/8	12 - 1	6
8	13-1/2	1-1/8	4	1-3/4	1-3/4	11-3/4	8-7/8	15	1-5/8	4-3/8	2-7/16	2-7/16	13	12 - 1	15	1-7/8	4-5/8	2-11/16	2-11/16	13	12 - 1-1/8	8
10	16	1-3/16	4	1-15/16	1-15/16	14-1/4	12 - 1	17-1/2	1-7/8	4-5/8	2-5/8	3-3/4	15-1/4	16 - 1-1/8	17-1/2	2-1/8	4-7/8	2-7/8	4	15-1/4	16 - 1-1/4	10
12	19	1-1/4	4-1/2	2-3/16	2-3/16	17	12 - 1	20-1/2	2	5-1/8	2-7/8	4	17-3/4	16 - 1-1/4	20-1/2	2-1/4	5-3/8	3-1/8	4-1/4	17-3/4	16 - 1-3/8	12
14	21	1-3/8	5	2-1/4	3-1/8	18-3/4	12 - 1-1/8	23	2-1/8	5-5/8	3	4-3/8	20-1/4	20 - 1-1/4	23	2-3/8	5-7/8	3-5/16	4-5/8	20-1/4	20 - 1-3/8	14
16	23-1/2	1-7/16	5	2-1/2	3-7/16	21-1/4	16 - 1-1/8	25-1/2	2-1/4	5-3/4	3-1/4	4-3/4	22-1/2	20 - 1-3/8	25-1/2	2-1/2	6	3-11/16	5	22-1/2	20 - 1-1/2	16
18	25	1-9/16	5-1/2	2-11/16	3-13/16	22-3/4	16 - 1-1/4	28	2-3/8	6-1/4	3-1/2	5-1/8	24-3/4	24 - 1-3/8	28	2-5/8	6-1/2	3-7/8	5-3/8	24-3/4	24 - 1-1/2	18
20	27-1/2	1-11/16	5-11/16	2-7/8	4-1/16	25	20 - 1-1/4	30-1/2	2-1/2	6-3/8	3-3/4	5-1/2	27	24 - 1-3/8	30-1/2	2-3/4	6-5/8	4	5-3/4	27	24 - 1-5/8	20
24	32	1-7/8	6	3-1/4	4-3/8	29-1/2	20 - 1-3/8	36	2-3/4	6-5/8	4-3/16	6	32	24 - 1-5/8	36	3	6-7/8	4-1/2	6-3/4	32	24 - 1-7/8	24
30	38-3/4	2-1/8	5-1/8	3-1/2		36	28 - 1-3/8	43	3-5/8	8-1/4	8-1/4		39-1/4	28 - 1-7/8	43	4	8-5/8	8-5/8		39-1/4	28 - 2-1/8	30
36	46	2-3/8	5-3/8	3-3/4		42-3/4	32 - 1-5/8	50	4-1/8	9-1/2	9-1/2		46	32 - 2-1/8	50	4-1/2	9-7/8	9-7/8		46	32 - 2-1/8	36

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ANSI FORGED STEEL FLANGES

600 Lb. Flanges								900 Lb. Flanges							1500 Lb. Flanges							
Nom. Pipe Size	O	C^2	Weld Neck	Y2 Slip on Thrd.	Lap Joint	Bolt Circle	No. and Size of Holes	O	C^2	Weld Neck	Y2 Slip on Thrd.	Lap Joint	Bolt Circle	No. and Size of Holes	O	C^2	Weld Neck	Y2 Slip on Thrd.	Lap Joint	Bolt Circle	No. and Size of Holes	Nom. Pipe Size
1/2	3-3/4	9/16	2-1/16		7/8	2-5/8	4-5/8	4-3/4	7/8	2-3/8	1-1/4	1-1/4	3-1/4	4-7/8	4-3/4	7/8	2-3/8	1-1/4	1-1/4	3-1/4	4-7/8	1/2
3/4	4-5/8	5/8	2-1/4		1	3-1/4	4-3/4	5-1/8	1	2-3/4	1-3/8	1-3/8	3-1/2	4-7/8	5-1/8	1-7/8	2-3/4	1-3/8	1-3/8	3-1/2	4-7/8	3/4
1	4-7/8	11/16	2-1/16		1-1/16	3-1/2	4-3/4	5-7/8	1-1/8	2-7/8	1-5/8	1-5/8	4	4 - 1	5-7/8	1-1/8	2-7/8	1-5/8	1-5/8	4	4 - 1	1
1-1/4	5-1/4	13/16	2-5/8		1-1/8	3-7/8	4-3/4	6-1/4	1-1/8	2-7/8	1-5/8	1-5/8	4-3/8	4 - 1	6-1/4	1-1/8	2-7/8	1-5/8	1-5/8	4-3/8	4 - 1	1-1/4
1-1/2	6-1/8	7/8	2-3/4		1-1/4	4-1/2	4-7/8	7	1-1/4	3-1/4	1-3/4	1-3/4	4-7/8	4 - 1-1/8	7	1-1/4	3-1/4	1-3/4	1-3/4	4-7/8	4 - 1-1/8	1-1/2
2	6-1/2	1	2-7/8		1-7/16	5	8-3/4	8-1/2	1-1/2	4	2-1/4	2-1/4	6-1/2	8 - 1	8-1/2	1-1/2	4	2-1/4	2-1/4	6-1/2	8 - 1	2
2-1/2	7-1/2	1-1/8	3-1/8		1-5/8	5-7/8	8-7/8	9-5/8	1-5/8	4-1/8	2-1/2	2-1/2	7-1/2	8 - 8-1/8	9-5/8	1-5/8	4-1/8	2-1/2	2-1/2	7-1/2	8 - 1-1/8	2-1/2
3	8-1/4	1-1/4	3-1/4		1-13/16	6-5/8	8-7/8	9-1/2	1-1/2	4	2-1/8	2-1/8	7-1/2	8 - 1	10-1/2	1-7/8	4-5/8	2-7/8	2-7/8	8	8 - 1-1/4	3
3-1/2	9	1-3/8	3-3/8		1-15/16	7-1/4	8 - 1															3-1/2
4	10-3/4	1-1/2	4		2-1/8	8-1/2	8 - 1	11-1/2	1-3/4	4-1/2	2-3/4	2-3/4	9-1/4	8 - 1-1/4	12-1/4	2-1/8	4-7/8	3-9/16	3-9/16	9-1/2	8 - 1-3/8	4
5	13	1-3/4	4-1/2		2-3/8	10-1/2	8 - 1-1/8	13-3/4	2	5	3-1/8	3-1/8	11	8 - 1-3/8	14-3/4	2-7/8	6-1/8	4-1/8	4-1/8	11-1/2	8 - 1-5/8	5
6	14	1-7/8	4-5/8		2-5/8	11-1/2	12 - 1-1/8	15	2-3/16	5-1/2	3-3/8	3-3/8	12-1/2	12 - 1-1/4	15-1/2	3-1/4	6-3/4	4-11/16	4-11/16	12-1/2	12 - 1-1/2	6
8	16-1/2	2-3/16	5-1/4		3	13-3/4	12 - 1-1/4	18	2-1/2	6-3/8	4	4-1/2	15-1/2	12 - 1-1/2	19	3-5/8	8-3/8	5-5/8	5-5/8	15-1/2	12 - 1-3/4	8
10	20	2-1/2	6		4-3/8	17	16 - 1-3/8	21-1/2	2-3/4	7-1/4	4-1/4	5	18-1/2	16 - 1-1/2	23	4-1/4	10	6-1/4	7	19	12 - 2	10
12	22	2-5/8	6-1/8		4-5/8	19-1/4	20 - 1-3/8	24	3-1/8	7-7/8	4-5/8	5-5/8	21	20 - 1-1/2	26-1/2	4-7/8	11-1/8	7-1/8	8-5/8	22-1/2	16 - 2-1/8	12
14	23-3/4	2-3/4	6-1/2		5	20-3/4	20 - 1-1/2	25-1/4	3-3/8	8-3/8	5-1/8	6-1/8	22	20 - 1-5/8	29-1/2	5-1/4	11-3/4		9-1/2	25	16 - 2-3/8	14
16	27	3	7		5-1/2	23-3/4	20 - 1-5/8	27-3/4	3-1/2	8-1/2	5-1/4	6-1/2	24-1/4	20 - 1-3/4	32-1/2	5-3/4	12-1/4		10-1/4	27-3/4	16 - 2-5/8	16
18	29-1/4	3-1/4	7-1/4		6	25-3/4	20 - 1-3/4	31	4	9	6	7-1/2	27	20 - 2	36	6-3/8	12-7/8		10-7/8	30-1/2	16 - 2-7/8	18
20	32	3-1/2	7-1/2		6-1/2	28-1/2	24 - 1-3/4	33-3/4	4-1/4	9-3/4	6-1/4	8-1/4	29-1/2	20 - 2-1/8	38-3/4	7	14		11-1/2	32-3/4	16 - 3-1/8	20
24	37	4	8		7-1/4	33	24 - 2	41	5-1/2	11-1/2	8	10-1/2	35-1/2	20 - 2-5/8	46	8	16		13	39	16 - 3-5/8	24
30	44-1/2	4-1/2	9-3/4			40-1/4	28 - 2-1/8	48-1/2	5-7/8	12-1/4	12-1/4	-	42-3/4	20 - 3-1/8								30
36	51-3/4	4-7/8	11-1/8			47	28 - 2-5/8	57-1/2	6-3/4	14-1/4	14-1/4	-	50-3/4	20 - 3-5/8								36

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ANSI FORGED STEEL FLANGES

2500 Lb. Flanges							
Nom. Pipe Size	O	C[2]	Weld Neck	Y2 Slip on Thrd.	Lap Joint	Bolt Circle	No. and Size of Holes
1/2	5-1/4	1-3/16	2-7/8	1-9/16	1-9/16	3-1/2	4-7/8
3/4	5-1/2	1-1/4	3-1/8	1-11/16	1-11/16	3-3/4	4-7/8
1	6-1/4	1-3/8	3-1/2	1-7/8	1-7/8	4-1/4	4 - 1
1-1/4	7-1/4	1-1/2	3-3/4	2-1/16	2-1/16	5-1/8	4 - 1-1/8
1-1/2	8	1-3/4	4-3/8	2-3/8	2-3/8	5-3/4	4 - 1-1/4
2	9-1/4	2	5	2-3/4	2-3/4	6-3/4	8 - 1-1/8
2-1/2	10-1/2	2-1/4	5-5/8	3-1/8	3-1/16	7-3/4	8 - 1-1/4
3	12	2-5/8	6-5/8	3-5/8	3-5/8	9	8 - 1-3/8
4	14	3	7-1/2	4-1/4	4-1/4	10-3/4	8 - 1-5/8
5	16-1/2	3-5/8	9	5-1/8	5-1/8	12-3/4	8 - 1-7/8
6	19	4-1/4	10-3/4	6	6	14-1/2	8 - 2-1/8
8	21-3/4	5	12-1/2	7	7	17-1/4	12 - 2-1/8
10	26-1/2	6-1/2	16-1/2	9	9	21-1/4	12 - 2-5/8
12	30	7-1/4	18-1/4	10	10	24-3/8	12 - 2-7/8

Welding Neck Flange Bores 1 & 2															
Nom. Pipe Size	Outside Diam.	Light Wall[6]	Sched. 20	Sched. 30	Std. Wall.	Sched. 40	Sched. 60	Extra Strong	Sched. 80	Sched. 100	Sched. 120	Sched. 140	Sched. 160	Double Extra Strong
1/2	0.840	.674			0.622	0.622		0.546	0.546				0.464	0.252
3/4	1.050	.884			0.824	0.824		0.742	0.742				0.612	0.434
1	1.315	1.097			1.049	1.049		0.957	0.957				0.815	0.599
1-1/4	1.660	1.442			1.380	1.380		1.278	1.278				1.610	0.896
1-1/2	1.900	1.682			1.610	1.610		1.500				1.338	1.100	
2	2.375	2.157			2.067	2.067		1.939	1.929				1.687	1.503
2-1/2	2.875	2.635			2.469	2.469		2.323	2.323				2.125	1.771
3	3.500	3.260			3.068	3.068		2.900	2.900				2.624	2.300
3-1/2	4.000	3.760			3.548	3.548		3.364	3.364					2.728
4	4.500	4.260			4.026	4.026		3.826		3.624		3.438	3.152	
5	5.563	5.295			5.047	5.047		4.813	4.813		4.563		4.313	4.063
6	6.625	6.357			6.065	6.065		5.761	5.761		5.501		5.187	4.897
8	8.625	8.329	8.125	8.071	7.981	7.981	7.813	7.625	7.625	7.437	7.187	7.001	6.813	6.875
10	10.750	10.420	10.250	10.136	10.020	10.020	9.750	9.750	9.562	9.312	9.062	8.750	8.500	8.750
12	12.750	12.390	12.250	12.090	12.000	11.938	11.626	11.750	11.374	11.062	10.750	10.500	10.126	10.750
14	14.000	13.500	13.376	13.250	13.250	13.124	12.812	13.000	12.500	12.124	11.814	11.500	11.188	
16	16.000	15.500	15.376	15.250	15.250	15.000	14.688	15.000	14.312	13.938	13.564	13.124	12.812	
18	18.000	17.500	17.376	17.124	17.250	16.876	16.500	17.000	16.124	15.688	15.250	14.876	14.438	
20	20.000	19.500	19.250	19.000	19.250	18.812	18.376	19.000	17.938	17.438	17.000	16.500	16.062	
24	24.000	23.500	23.250	22.876	23.250	22.624	22.062	23.000	21.562	20.938	20.376	19.876	19.312	
30	30.000	29.376	29.000	28.750	29.250			29.000						
36	36.000	35.376	35.000	34.750	35.250	34.500		35.000						
42	42.000				41.250			41.000						

NOTES:

1. Always specify bore when ordering.
2. Includes 1/16'' raised face in 150 lb. and 300 lb. standards. Does **not** include 1/4'' raised face in 400 lb. and heavier standards.
3. Inside pipe diameters are also provided by this table.
4. Other types, sizes and facings on application.
5. Stocked in carbon steel and a variety of other metals and alloys.
6. Light Wall diameters are identical to stainless steel Schedule 10S in sizes thru 12'', and to Schedule 10 in sizes 14'' and larger.

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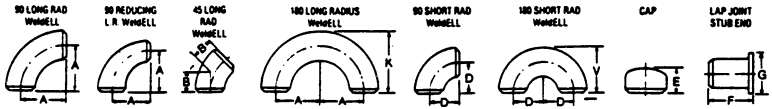
SEAMLESS WELDING FITTINGS



Nom. Pipe Size	Pipe O.D.	Wall Thickness: Light [1] Wall	Sch 20	Sch 30	2 Std.	Sch 40	Sch 60	XS	Sch 80	Sch 100	Sch 120	Sch 140	Sch 160	XXS	A	B	K	D	V	E	F: ASA	F: MSS	G	Nom. Pipe Size
1/2	.840	.083			.109	.109		.147	.147				.188	.294	1-1/2	5/8	1-7/8			1	3	2	1-3/8	1/2
3/4	1.050	.083			.113	.113		.154	.154				.219	.308	1-1/8	7/16	1-11/16			1-1/2	3	2	1-11/16	3/4
1	1.315	.109			.133	.133		.179	.179				.250	.358	1-1/2	7/8	2-3/16	1	1-5/8	1-1/2	4	2	2	1
1-1/4	1.660	.109			.140	.140		.191	.191				.250	.382	1-7/8	1	2-3/4	1-1/4	2-1/16	1-1/2	4	2	2-1/2	1-1/4
1-1/2	1.900	.109			.145	.145		.200	.200				.281	.400	2-1/4	1-1/8	3-1/4	1-1/2	2-7/16	1-1/2	4	2	2-7/8	1-1/2
2	2.375	.109			.154	.154		.218	.218				.344	.436	3	1-3/8	4-3/16	2	3-3/16	1-1/2	6	2-1/2	3-5/8	2
2-1/2	2.875	.120			.203	.203		.276	.276				.375	.552	3-3/4	1-3/4	5-3/16	2-1/2	3-15/16	1-1/2	6	2-1/2	4-1/8	2-1/2
3	3.500	.120			.216	.216		.300	.300				.438	.600	4-1/2	2	6-1/4	3	4-3/4	2	6	2-1/2	5	3
3-1/2	4.000	.120			.226	.226		.318	.318					.636	5-1/4	2-1/4	7-1/4	3-1/2	5-1/2	2-1/2	6	3	5-1/2	3-1/2
4	4.500	.120			.237	.237		.337	.337		.438		.531	.674	6	2-1/2	8-1/4	4	6-1/4	2-1/2	6	3	6-3/16	4
5	5.563	.134			.258	.258		.375	.375		.500		.625	.750	7-1/2	3-1/8	10-5/16	5	7-3/4	3	8	3	7-5/16	5
6	6.625	.134			.280	.280		.432	.432		.562		.719	.864	9	3-3/4	15-5/16	6	9-5/16	3-1/2	8	3-1/2	8-1/2	6
8	8.625	.148	.250	.277	.322	.322	.406	.500	.500	.594	.719	.812	.906	.875	12	5	16-5/16	8	12-5/16	4	8	4	10-5/8	8
10	10.750	.165	.250	.307	.365	.365	.500	.500	.594	.719	.844	1.000	1.125	1.000	15	6-1/4	20-3/8	10	15-3/8	5	10	5	12-3/4	10
12	12.750	.180	.250	.330	.375	.406	.562	.500	.688	.844	1.000	1.125	1.312	1.000	18	7-1/2	24-3/8	12	18-3/8	6	10	6	15	12
14	14.000	.250	.312	.375	.375	.438	.594	.500	.750	.938	1.094	1.250	1.406		21	8-3/4	28	14	21	6-1/2	12		16-1/4	14
16	16.000	.250	3.12	.375	.375	.500	.656	.500	.844	1.031	1.219	1.438	1.594		24	10	32	16	24	7	12		18-1/2	16
18	18.000	.250	.312	.438	.375	.562	.750	.500	.938	1.156	1.375	1.562	1.781		27	11-1/4	36	18	27	8	12		21	18
20	20.000	.250	.375	.500	.375	.594	.812	.500	1.031	1.281	1.500	1.750	1.969		30	12-1/2	40	20	30	9	12		23	20
24	24.000	.250	.375	.562	.375	.688	.969	.500	1.219	1.531	1.812	2.062	2.344		36	15	48	24	36	10-1/2	12		27-1/4	24
30	30.000	.312	.500	.625	.375			.500							45	18-1/2	60	30	45	10-12				30
36 [4]	36.000	.312	.500	.625	.375	.750		.500							54	22-1/4		36	54	10-1/2				36 [4]
42 [4]	42.000				.375			.500							63	26		48		12				42 [4]

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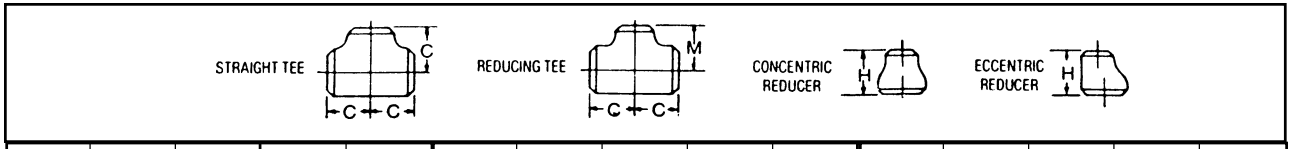
SEAMLESS WELDING FITTINGS



Nom. Pipe Size	Outlet	C	M	H
3/4	3/4	1-1/8		
	1/2	1-1/8	1-1/8	1-1/2
1	1	1-1/2		
	3/4	1-1/2	1-1/2	2
	1/2	1-1/2	1-1/2	2
1-1/4	1-1/4	1-7/8		
	1	1-7/8	1-7/8	2
	3/4	1-7/8	1-7/8	2
	1/2	1-7/8	1-7/8	2
1-1/2	1-1/2	2-1/4		
	1-1/4	2-1/4	2-1/4	2-1/2
	1	2-1/4	2-1/4	2-1/2
	3/4	2-1/4	2-1/4	2-1/2
	1/2	2-3/4	2-3/4	2-1/2
2	2	2-1/2		
	1-1/2	2-1/2	2-3/8	3
	1-1/4	2-1/2	2-1/4	3
	1	2-1/2	2	3
	3/4	2-1/2	1-3/4	3

Nom. Pipe Size	Outlet	C	M	H
2-1/2	2-1/2	3		
	2	3	2-3/4	3-1/2
	1-1/2	3	2-5/8	3-1/2
	1-1/4	3	2-1/2	3-1/2
	1	3	2-1/4	3-1/2
3	3	3-3/8		
	2-1/2	3-3/8	3-1/4	3-1/2
	2	3-3/8	3	3-1/2
	1-1/2	3-3/8	3	3-1/2
	1-1/4	3-3/8	2-3/4	3-1/2
3-1/2	3-1/2	3-3/4		
	3	3-3/4	3-5/8	4
	2-1/2	3-3/4	3-1/2	4
	2	3-3/4	3-1/2	4
	1-1/2	3-3/4	3-1/8	4
4	4	4-1/8		
	3-1/2	4-1/8	4	4
	3	4-1/8	3-7/8	4
	2-1/2	4-1/8	3-3/4	4
	2	4-1/8	3-1/2	4
	1-1/2	1/8	3-3/8	4

Nom. Pipe Size	Outlet	C	M	H
5	5	4-7/8	-	-
	4	4-7/8	4-5/8	5
	3-1/2	4-7/8	4-1/2	5
	3	4-7/8	4-3/8	5
	2-1/2	4-7/8	4-1/4	5
	2	4-7/8	4-1/8	5
6	6	5-5/8	-	-
	5	5-5/8	5-3/8	5-1/2
	4	5-5/8	5-1/8	5-1/2
	3-1/2	5-5/8	5	5-1/2
	3	5-5/8	4-7/8	5-1/2
	2-1/2	5-5/8	4-3/4	5-1/2
8	8	7	-	-
	6	7	6-5/8	6
	5	7	6-3/8	6
	4	7	6-1/8	6
	3-1/2	7	6	6
10	10	8-1/2	-	-
	8	8-1/2	8	7
	6	8-1/2	7-5/8	7
	5	8-1/2	7-1/2	7
	4	8-1/2	7-1/4	7

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SEAMLESS WELDING FITTINGS

Nom. Pipe Size	Outlet	C	M	H
12	12	10		
	10	10	9-1/2	8
	8	10	9	8
	6	10	8-5/8	8
	5	10	8-1/2	8
14	14	11		
	12	11	10-5/8	13
	10	11	10-1/8	13
	8	11	9-3/4	13
	6	11	9-3/8	13
16	16	12		
	14	12	12	14
	12	12	11-5/8	14
	10	12	11-1/8	14
	8	12	10-3/4	14
	6	12	10-3/8	14
18	18	13-1/2		
	16	13-1/2	13	15
	14	13-1/2	13	15
	12	13-1/2	12-5/8	15
	10	13-1/2	12-1/8	15
	8	13-1/2	11-3/4	15

Nom. Pipe Size	Outlet	C	M	H
20	20	15		
	18	15	14-1/2	20
	16	15	14	20
	14	15	14	20
	12	15	13-5/8	20
	10	15	13-1/8	20
	8	15	12-3/4	20
24 4	24	17		
	20	17	17	20
	18	17	16-1/2	20
	16	17	16	20
	14	17	16	20
	12	17	15-5/8	20
	10	17	15-1/8	20
30 4	30	22-1/2		
	24	22	21	24
	20	22	21	24
	20	22	19-1/2	24
	18	22	19-1/2	24
	16	22	19	24
	14	22	19	24

Nom. Pipe Size	Outlet	C	M	H
36 4	36	26-1/2		
	30	26-1/2	25	24
	24	26-1/2	24	24
	20	26-1/2	23	24
	18	26-1/2	22-1/2	24
	16	26-1/2	22	24
42 4	42	30		
	36	30	28	24
	30	30	28	24
	24	30	26	24
	20	30	26	24

NOTES:

1. Light Wall thicknesses are identical to stainless steel Schedule 10S in sizes thru 12'', and to Schedule 10 in. sizes 14'' and larger.
2. Standard Wall thicknesses are identical to stainless steel Schedule 40S in sizes thru 12''.
3. Extra Strong Wall thicknesses are identical to stainless steel Schedule 80S in sizes thru 12''.
4. May be of welded pipe, x-rayed and stress-relieved.
5. Other types, sizes, and thicknesses of fittings on application.
6. Stocked in carbon steel and a variety of other metals and alloys.

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